# C.A.S. EXPEDITION

## 1961 – 1962

## INDIA, PAKISTAN, NEPAL, MALAYA, THAILAND

E.S. ROSS & D. CAVAGNARO
COLLECTORS

NOTE – all mileages are road mileages rather than straight-line, point-to-point distances from maps.

The altimeter readings for this trip were not always accurate; occasionally it was found that the altimeter was recording either low or high. Attempts have been made to correct these, but still these readings should be used only as close approximations. They are for all practical purposes quite adequate in terms of life zones.

# EAST PAKISTAN

E. PAKISTAN: 500 specimens
CHITTAGONG
IX-10-61 2 METERS

Chittagong lies on very low land, subject to inundation during the monsoon in many areas, very near the shore of the Bay of Bengal. September represents the end of the monsoon; heavy showers still fall each day and the land is lush and green (or at least as lush as the heavy population of cattle, water buffalo, goats, and men will allow). The rice paddies are green & flourishing.

Nearly all specimens were collected either at the lights of the freighters in dock along the banks of the Karnafuli, or in grassy meadows nearby in the railroad yards. Many small ponds & boggy areas are good for aquatics & sweepings. Weather — hot, humid, varying between full sun & sudden showers.

STOP 1 - E. PAKISTAN:
ICHAMATI, 28 MI. E.
CHITTAGONG 50 FT.
IX-14-61
3000 specimens.

This forest reserve area, one of the last in the country, is situated in rolling hills just at the edge of the flatland delta rice country. The forest is mostly secondary, or disturbed scrub with tall grasses, etc. Many ponds and marshy areas close by provide good Odonata collecting. Rice fields nearby. These low hills are the first sign of the Chittagong Hill Tract, area heavily forested, now covered with residual & secondary monsoon growth or agricultural fields. Weather - hot, humid, with occasional showers.

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STOP 2 - E. PAKISTAN:
20 MI. E. CHITTAGONG
IX-15-61 20 ft.
30 specimens.

This was a quick afternoon stop in flat paddy country with small isolated "islands" of disturbed flora — trees & shrubs & grasses - near small villages. This vegetation pattern seems to be the most common in the Pakistan delta lowlands today. Hot, humid, and still.

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STOP 3 - E. PAKISTAN:
HARBANG FOREST
6 MI. N. CHIRINGA
50 FT. IX-18-61
3000 specimens.

Harbang Forest is situated about 50 miles roughly south from Chittagong, en route to Cox's Bazaar. Most of the natural & man-made vegetation associations typical of the E. Pakistan lowlands are represented in this region. There is a good forest rest house situated on a little hill overlooking a meandering stream. Camp was located in the yard of this building. The surrounding countryside

is gently rolling hills webbed with small streams and marshy spots. In many places there still exists good dense jungle with native teak, but in some areas the forest is being replaced with teak trees. Rice fields are here & there scattered among the patches of forest or plantation. Rain fell frequently in heavy downpours, followed by clear, sunny periods with high humidity. Insect collecting was good both day and night.

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STOP 4 - E. PAKISTAN
BARAIYADHALA
FOREST RES.
150 ft. IX-21-61
4000 specimens.

Baraiyadhala is one of the finest accessable natural areas we visited in East Pakistan. There is a comfortable rest house, reachable by road, at the foot of a substantial range of hills on the Burma side of the flatlands.

These hills are webbed with trails; one excellent collecting track leads right up into the forest from the forestry bungalow. Most net & log material was taken along this trail. The jungle is practically intact, excepting bamboo cutting by the hill tribes, etc, and consists of a wide variety of tall trees, vines, and large bamboo, with an understory of herbaceous or broad-leaved shrubs, cycads, ferns, wild begonias, etc. Epiphytic growth is extensive on trunks & branches. The weather was hot and humid, with frequent heavy showers, terminating the monsoon season.

Black light collecting was good; the light drew from the hills not far away, and from the flat rice paddy land on all other sides.

STOP 5 - E. PAKISTAN: FENI
10 ft. IX-23-1961
25 specimens

Quick stop in flat rice paddy area with scattered clumps of trees and bamboo. Village huts nearby. Grass a rice green from plenty of rain. Cloudy, warm day

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STOP 6 - E. PAKISTAN: COMILLA
50 ft. IX-23-61
1000 specimens.

Camp situated in a yard near town, overlooking a large "tank" or pond. Vegetation entirely disturbed — planted gardens, grazed grass, etc. Entirely flat country.
Night collecting was slow, probably because of a full moon. Temperature moderate, humidity high.

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STOP 7 - E. PAKISTAN: SYLHET
50 ft. IX-25-61
30 specimens.

A few specimens were collected in and around the Dak Bungalow right in town. A large tank or pond is situated behind the bungalow, a river across the road in front. Large trees, small shrubs, and grassy areas comprised the chief vegetation in the yard.
Rainy, Cool. Flat country

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STOP 8 - E. PAKISTAN: LAWA CHERA FOREST, SRIMANGAL
110 M, IX-27-61
4000 specimens.

In the vast expanses of E. Pakistan lowlands there are very few topographic features of any kind, let alone anything big enough to be called a hill. Lawa Chera Forest Reserve, however, is a very fine area of forest in a small but ~~fa~~ "relatively" high ~~trip~~ hill group roughly south from Sylhet.

There is a beautiful forestry rest house situated right in

the trees on a steep knoll overlooking the surrounding forest. The jungle in this reserve is nearly undisturbed; some small villages with their tiny fields and gardens may be found here and there, but most of the hills around the rest house have been disturbed only by trails, the railroad, and a minimum of logging. Unfortunately this beautiful spot — as good as one could find in E. Pak. for biological work — is scheduled to be cut over and planted with teak within a few years.

The black light was placed against the almost luminous white walls of the rest house and drew from the surrounding forest; the result was fantastic. Moth collecting was especially good.

There are no major perennial streams in this area, though small creeks are quite frequent along forest trails. The trails themselves serve as creeks during the momentary "flash floods" from frequent cloudbursts.

The weather was very changeable — torrential rains one hour, hot sun the next. Rain fell at least 2 or 3 times each day. The absence of moonlight and proximity of the jungle resulted in good collecting at night. Wind absent, humidity high.

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STOP 9 - E. PAKISTAN:
CHICKNAGUL, 10 MI. N. SYLHET
10 M., IX-30-61
100 specimens.

A night and morning stop on a knoll rising a little above the surrounding flat rice land. Many trees and much tangled growth covered parts of the area, though buildings and roads cut into the wooded areas. Bark collecting in a pile of cut logs and stumps was good. Weather cool, humidity high. Rain interrupted black light work. No moonlight.

STOP 10 – E. PAKISTAN:
JAINTIAPUR, 5M,
IX-30-61

40 specimens.

Short stop in the heart of this small village not far from the sudden escarpment of the Khasi Hills. Hot, humid midday. Butterflies and moths were collected on hybiscus flowers in gardens; carpenter bees were taken around the wood of village ~~roofs~~ roofs. The little town is situated in a very flat area which becomes quite boggy during the heaviest part of the monsoon. The monsoon is on its way out by early October, however, and the rice is thriving at this time.

~~around the wood of the village houses. 40 specimens.~~

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STOP 11 – TAMABIL, E. PAKISTAN
IX-30-61

Short afternoon stop at this border village at the foot of the Khasi-Jaintia Hills. Elevation 5 METERS. Countryside very wet and swampy, with many fields of rice or swampy, grassy bogs. Many small knolls, fairly tree covered, rose out of the flatland, and the hills rose steeply from the collecting sight. Most insects collected at hybiscus flowers and other flowering plants, or in the grass. Spiders collected along roadbanks covered extensively with plants.

150 specimens

Hot, humid afternoon, no wind, partially cloudy.

Blossoming BER tree excellent for hymenoptera — bees

INDIA ASSAM

STOP 12 - 3 MI. N. DAWKI, ASSAM IX-30-61

Climbing steeply up the road to Shillong into the Khasi-Jaintia Hills, we make a short afternoon lunch stop at 160 meters elev. in the forest along a "mountain" stream. Temperature fairly cool, afternoon sunny. Petrigids on rocks along stream. 50 specimens.
Dense rain forest.

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STOP 13 - 7 MI. S. PYNURSLA, ASSAM IX-30-61

An evening, night, and morning stop at ~~1,000~~ 1010 meters elevation in the Khasi-Jaintia Hills on the Shillong road. Camped in a grassy field backed directly by an amphitheater of hills, down the middle of which ran a fairly swift creek draining the local slopes. Hills densely covered by tangled growth and forest. Weather cool, partially cloudy. We had perhaps a rare rainless evening of excellent black-light collecting, though the rain finally interrupted work.* It rained all night and the next morning. Obviously an extremely wet life zone (Cherapunji nearby has an annual average of 426 inches!)
2,000 specimens

* rain began about midnight

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STOP 14 - PYNURSLA, ASSAM X-1-61

Short stop at 1360 M. elevation. Grassy, rolling hills drop steeply into a Trewartha canyon with forested slopes. Collected on the borderline between the grass and the steep, bushy slopes of a ravine. Weather cool, sunny, and slightly breezy.
1000 specimens

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STOP 15 - SHILLONG, ASSAM X-2-61

Camped one night in town, surrounded by Cryptomeria trees, lantana, and planted garden plants.

Pines nearby. Weather cool, partially cloudy, and rainy (part of the time).

100 specimens

4,900 ft.

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STOP 16 – 12 MI. S. SHILLONG, ASSAM. X-3-61

A one-hour stop in a small stream valley of grass and granite rocks. Slopes covered primarily with pine trees and, where cut over, with vegetables of various sorts. Elevation 1660 M. Weather warm and sunny.

500 specimens.

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STOP 17 – CHERRAPUNJI, ASSAM X-3-61

Afternoon stop at the rainiest spot in the world on a rare clear, sunny day. Breezy on the hills, still and hot in the creek ravines. Collected in the rolling grassy fields overlooking an immense forested gorge. Grassy slopes of the plateau dropped suddenly toward a steep cliff where the vegetation changed to dense bushes and cloud forest. Some exposed granite rocks. Elevation 1310 meters. Some collecting late in the afternoon in the cloud forest itself. Forest temperature cooler than field temperature.

100 specimens.

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STOP 18 – 4 MI. N. CHERRAPUNJI, ASSAM X-3-61

A night and morning stop in a grassy field bordered by a dense cloud forest. Weather remained clear all night; morning warm and sunny. Moonless evening excellent for moths at the black light. Countryside similar to that of Cherrapunji itself. Elevation

1378 meters. 100 specimens.

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STOP 19 – 4 MI. N. SHILLONG,
ASSAM, X-5-61

Short stop along the road "down the hill" north of Shillong. Collected in the grass on the road banks, surrounded by steep forested slopes. Weather warm and clear – morning. 50 specimens.
1000 meters

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STOP 20 – 13 MI. N. SHILLONG,
ASSAM X-5-61

Short afternoon stop near an isolated canyon forest. Surrounding countryside completely cut over and covered with shrubs and secondary growth. Weather cloudy and fairly warm. Still in the hills. 900 meters
100 specimens, some from rice paddy area at base of the hills.

ASSAM AMSOI FOREST REF.
5 M. X-5-61

STOP 21 – AMSOI FOREST
(28 MI. SW. NOWGONG)
ASSAM X-5-61

A night and morning stop in a flat, old plantation forest. Much undergrowth, though the area was much drier than all previous stops. Weather in the morning quite still and hot, in the evening warm and humid.
50 meters 500 specimens.
Hills not far away.

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STOP 22 – 30 MI. N.E. NOWGONG,
ASSAM X-6-61

A quick stop in a dense grove of giant bamboo on a warm afternoon. Occasional trees scattered among the clumps of bamboo; mosquitos on the bark of these trees. 90 meters
25 specimens

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STOP 23 – ASSAM: GOTANGA (FOREST)
KAZIRANGA X-6-61

A short stop in the forest strip region of the Kaziranga Wildlife

Sanctuary. Forest untouched except for a pipeline area cleared of trees and bushes. Forest dense and tangled, wet from a recent rain, but fairly cool. Sky Cloudy. Elevation 97 meters. 50 specimens

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STOP 24 – ASSAM: KOHARA, KAZIRANGA X-7-61

A two-day stop in the Sanctuary at Kaziranga. Camp, and therefore the black light, overlooking a stream and rolling hills covered with tangled jungle and hardwood plantations, was itself situated on a knoll 100 meters elevation and most collecting was done at about that elevation, either in the forest, along the stream, or in nearby grassy fields. Weather warm, partially Cloudy, with some occasional showers.

1,000 specimens.

STOP 25 – DIMAPUR, ASSAM X-8-61

A short stop near town – vegetation disturbed and planted. Collected on flowering hybiscus and other flowering plants. Hot afternoon. 150 meters. 25 specimens.

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STOP 26 – ASSAM: GARAMPANI ~~WILDLIFE~~ RESERVE, 10 MI. S. GOLAGHAT X-9-61

A two-day stop in the forest reserve – wildlife sanctuary at Garampani. Planted trees and some garden around camp with undesturbed forest ("jungle") surrounding at 100-300 yards distance. Diurnal collecting along trails through the jungle and along streams. Small amount of rain fell in one shower; weather sunny, hot, and humid for the most part. Forest condition wet rather than fairly dry – many vines and trees in bloom. Elevation 110 meters. Countryside slightly rolling hills; no major

hills near. 4,000 specimens.

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STOP 27 – ASSAM: MELENG
FOREST ~~RESERVE~~, MARIANI
X-10-61

Camped one night along a cleared track in a 35-year-old hardwood plantation. Many large trees and much tangled undergrowth. Weather cool early in the evening; rainy after a few hours of darkness. 200 specimens
110 meters.
(tiger camp)

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STOP 28 – ASSAM: ABHOYPUR
FOREST, NAPHUK
X-12-61

A two-day stop along a rough jeep track in fairly virgin jungle. Countryside very hilly; jungle nearly impenetrable. Diurnal collecting along the rugged road itself; nocturnal collecting with exposure up and down the road. Forest primarily Dipterocarpus. Weather hot, still, and humid during the day. Torrential rain the first night, slight drizzle the second.
3,000 specimens
Sweeping in grassy spots.

EL. 360 METERS

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STOP 29 – ASSAM: 8 MI. E. LEDO
X-13-61

A night and day stop in the forestry colony compound of Tirap, 8 miles above Ledo on the Stilwell Road. Camped in flat countryside, 135 meters in elevation; hills rose steeply some distance away. Lawn and planted shrubs near camp. Most diurnal collecting at flowering hybiscus and other blossoming shrubs — some along a trail into the forest.
700 specimens.

Not days, and nights.

CAUTION – labels in layers say NW LEDO – It should be East of LEDO, as indicated above.

STOP 30 – 5 MI. W DIGBOI, ASSAM
X-15-61

Stopped one night in a relatively undesturbed Dipterocarpus forest in the flat valley of the Brahmaputra. Cool night, no rain.
110 meters el. 1,000 specimens

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STOP 31 – ASSAM: KOHARA,
KAZIRANGA X-16-61

Stopped for one night in the same spot which constituted stop 24 (see description). Weather fairly clear while the black light was on, though it rained very hard later in the night. Great quantities of beetles and small insects came to the light shortly after dark; moths came later. 110 M.
3,000 specimens.

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STOP 32 – ASSAM:
12 MI. S. GOALPARA
X-16-61

One-night stop in an extensive well established Sal plantation forest. Forest floor thickly covered with bushes and vines. Conditions were very dry in the forest itself, though there were rice paddies in the low spots some distance from camp. No clearing; black light situated in the midst of the forest along the overgrown jeep tracks.
Elevation 25 meters – 500 specimens.

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STOP 33 – ASSAM:
13 MI. SW. KOCHUGAON
X-17-61

Stopped one night in the grounds of the Mornai Tea Estate, still in the Brahmaputra Valley 50 meters elevation. Large trees scattered through the acres of tea constituted the principle flora. Lawn and planted shrubs grew close by. Night cool; much dew, no rain.
200 specimens.

NOTE: Correct spelling is KOCHUGAON; later labels are misspelled KUCHUGAON.

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STOP 34 - ASSAM:

4 MI. W. KOCHUGAON

X-17-61

A quick afternoon stop in an old hardwood plantation, primarily of Sal. Much tall grass and tangled vines and bushes under the trees. Small streams nearby. Collected along the small road and trails. Clear sky — hot afternoon. Elevation 50 meters.

200 specimens

— On the road to Sorairbil —

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STOP 35 - ASSAM:

14 MI. W. KOCHUGAON

X-18-61

Stopped one night on a road out of the village Raimana. Countryside flat, elevation 25 meters. Himalaya foothills rise sharply perhaps 25 miles to the north. Flora in the area entirely disturbed; patches of old plantation disrupted by sections of recently planted hardwoods, covered thickly with elephant grass and other large grasses.

A small creek ran some 50 feet from camp. Night cool and still, with heavy dew. A half moon shone during collecting hours.

2,000 specimens.

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STOP 36 - ASSAM:

10 MI. S.W. KOCHUGAON

X-19-61

An afternoon stop along the "main" road in an old forest composed primarily of Sal. Undergrowth small and thin. Collected primarily under the bark of fallen logs and along the edge of the road near small ponds. Elevation 50 meters.

200 specimens.

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WEST BENGAL

STOP 37 - WEST BENGAL:

LATAGURI X-21-61

A short early morning stop along the main trunk road to Siliguri. Plantation forest, mostly old Sal trees, with some undergrowth. Temperature warm, humidity low. 110 meters elevation. 100 specimens. Collected as well in some patches of virgin forest.

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STOP 38 - WEST BENGAL:

CHUNBATI X-21-61

Driving up the mountains from Siliguri to Darjeeling there is a small hill village some 12 miles from Siliguri. Stopped along the road just below Chunbati at el. 560 meters and collected in the grass and shrubs along the road. Very steep countryside covered with trees. Conditions fairly dry. Clear, sunny day, warm in the sun cool in the shade. 100 specimens.

STOP 39 - WEST BENGAL:

DILARAM X-21-61

Just Beyond Kurseong on the Darjeeling road is the above village and a patch of reserve forest in the Kurseong District. Stopping for a few minutes late in the afternoon, we collected 150 specimens in the very cool, wet cloud forest at 1700 meters elevation.

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STOP 40 - WEST BENGAL:

DEBREPANI, 10 MI. W.

GHUM X-22-61

A one day, 2 night stop at the Debrepani forest rest house at 2010 meters elevation. The place was reached by means of a main road from Ghum (also spelled Ghoom) to Sukhaipokhari and by a branch road from the latter town. The collecting area consisted of very steep hillsides covered by secondary forests primarily. Some patches of Cryptomeria forest had

been planted as early as 1890. Collecting trails passed through some natural regeneration cloud forest of maples, alders, et, and in other areas through old hardwood plantations. The undergrowth in the cloud forest types consisted of grasses and small flowering sages and shrubs. Nothing grew under the stands of Cryptomeria and collecting was productive only at the fringes of such forests. Here and there small grassy clearings provided good collecting. The weather remained clear; the sun was quite warm, though the shadows remained cool. Both nights were "chilly" (54°-56°F) and the black light attracted almost nothing. A full moon shone as well. 700 specimens.

NOTE – ALL ALTITUDES PREVIOUS TO THAT OF STOP 41 SHOULD BE INCREASED BY ABOUT 8 METERS (ALTIMETER HAD BEEN READING LOW)

STOP 41 – WEST BENGAL:
BADAMTAM FOREST,
DARJEELING DIST.
X-24-61

At 1800 ft elevation, on the Darjeeling side of the Rangit River canyon, a ridge of well-drained schists provides the right conditions to support an isolated population of Chir pines (PINUS ROXBURGHII). The ridge is quite dry and rocky, and ~~primarily~~ a stunted type of Sal, some date palms (Phoenix), Vernonia (a tree Compositae), and grasses (primarily citronella grass) grow there, the pines being scattered here and there among the cover of Sal. Weather was clear and warm during our short afternoon stop. 150 specimens.

← (HAS BEEN DONE)

STOP 42 - WEST BENGAL:
5 MI. W. GHUM
X - 25 - 61

A night and morning stop in the compound of the Lepchajagat Rest House (forest bungalow) just off the Ghum - Sukhaipokhari Road. Marigolds, goldenrod, and other flowers had been planted in the garden, and some large Rhododendron trees grew about the grounds. The whole place was surrounded with forest much like that of Stop 40, farther down the ridge. The night was chilly and little came to the lights. The morning sun was very warm and insects began flying early. 150 specimens. El 7250 feet.

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STOP 43 - W. BENGAL:
KALIMPONG X - 26 - 61

A night and morning stop on the top of a ridge just above town. Area somewhat residential and entirely disturbed - with planted flowers and grazed grass. Many large trees around camp - pines, magnolias, and others. Night slightly cool, morning warm but breezy. 150 specimens - el. 1275 meters.

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STOP 44 - W. BENGAL:
4 MI. SW KALIMPONG
X - 27 - 61

Stopped briefly at the top of a ridge overlooking the Teesta Valley and collected in a village area on Lantana, Hybiscus, and various crops. Forests had been completely cut away and scrubby bushes covered the steep slopes where crops were not being grown, large bamboo nearby. Windy, warm morning. 50 specimens El. 1375 meters.

STOP 45 – WEST BENGAL:
6 MI. S. KALIMPONG
X-27-61

Stopped briefly on the main road from the Tista Bridge to Kalimpong and collected in a forest of Sal and Ficus. There was an understory of scattered Pandanus and a groundcover of ferns and small herbs in the shade of the tall forest trees. Some sunny, grassy spots along the road proved productive. 50 specimens
Elevation 500 meters. A very small stream ran through the area; the condition of the forest soil was fairly moist.

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STOP 46 – WEST BENGAL:
5 MI. S. RONGPO
X-27-61

The compound of the Tarkhola Forest office, on the Tista Bridge-Gangtok road, provided a representative fauna similar to the plains fauna. The campsite was a large grassy area on level ground; steep hills of the Tista River canyon, covered primarily with Sal trees, formed the backdrop of the camp. A small stream flowed past camp on one side. The weather in the afternoon was warm and sunny; the night was pleasantly cool and very dewy. Elevation 375 meters. 300 specimens.

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STOP 47 – WEST BENGAL:
MALDA X-28-61

Stopped for one night in a grassy spot on the outskirts of the town. Area entirely disturbed with houses & planted trees; grass heavily grazed. Camp located on the banks of the Mahananda River. Weather partially cloudy; temperature during collecting hours about 73°F. Elevation 110 meters 5000 specimens.

STOP 48 - 6 MI. NE BORIO,
W. BENGAL
X-30-61

Driving generally S.W. from Rajmahal, on the south bank of the Ganges, one soon climbs into a range of low, rocky hills. We camped for a day and 2 nights in a grassy clearing 220 meters in elevation, surrounded by rolling brush- and tree-covered hills. Wild mangos and certain figs grew here and there on the hills among many other species of trees and shrubs. The weather remained rainy during our entire stay; collecting therefore was rather restricted to stone turning and barking. Temperature averaged 75. 500 SPECIMENS
(Borio is a small and tiled village on the western side of the hills.)

RAJMAHAL HILLS

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STOP 49 - W. BENGAL:
40 MI. NE. DUMKA
X-31-61

A short ambiid stop in the "stop 48 range" of hills. Collected under stones on a very rocky slope under a sparse cover of trees (Sal and others). Surrounding countryside rolling hills and valleys. The grass cover was good in the treeless areas. The ground was quite moist (though well-drained) from a recent rain. Temperature 75, sky clear. El. 100 meters 200 specimens.

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STOP 50 - W. BENGAL:
12 MI. NE DUMKA
X-31-61

Stopped briefly for Embiroptera in an open, flat, grassy field, some of which is used for crops during part of the year. Collected under scattered outcrops of sedimentary rock. Temperature 75 - sky clear El. 200 meters 100 specimens.

BIHAR

STOP 54 - BIHAR:
6 MI N.E. DHANBAD
XI-7-61
Stopped briefly just south west of Gobindpur (junction, Grand Trunk Road - Delhi to Calcutta) on the road to Ranchi. Collected on the slopes of a more or less isolated hill covered with secondary tree and Lantana growth. Grass heavily grazed; soil moist from recent rains but well-drained. (Lateritic, red soil). Collected under stones primarily.
150 specimens 250 meters

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STOP 55 - BIHAR:
TULIN XI-7-61
Stopped for an hour during the afternoon in the hills near Tulin, southwest of Jhalda. Conditions much like stop 54, though the hills were composed largely of granitic outcrops. Warm, sunny day.
150 specimens 350 meters

STOP 56 - BIHAR:
NAMKUM, RANCHI
XI-8-61

Five miles E. of Ranchi is the Indian Lac Research Institute, located in flat countryside 675 meters in elevation. Collected primarily in the fields of grass and flowers in the lac plantation between the various host plants of the lac scale (KUSUM tree - Schlichera; BER tree - Zizyphus jujubus; Acacia catechu; albizzia lucida; Samanea Saman; "Flame of the forest"*, etc.). Camp located in the Institute grounds, a park-like area of grass, flowers, and large planted trees of many species; some collecting was done in this area. Weather warm and sunny; evenings 65°-70° F, cooling off toward morning.
Soil still moist; average rainfall in this region is about 60 inches. 350 specimens

* BHUTIA

STOP 57 - BIHAR:
20 MI. N.E. RANCHI
XI-9-61

Collected during the day in rolling countryside covered with scattered Kusum and Sal trees and an abundance of Lantana, the chief weed in the area. Grass grazing areas with stones provided rather sparse collecting while moist rice stubble fields and bean patches were more productive. Warm, sunny day. Elevation 650 meters 300 specimens

The area may be reached by means of a road running north from the main Ranchi road, having its junction 10 miles E. of Nawkum.

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STOP 58 - BIHAR:
12 MI. S.E. NETARHAT
XI-10-61

Camp located on the Ranchi-Netarhat road just at the base of the escarpment of the hills on which Netarhat itself is situated. Collected during the late afternoon and evening, under stones and at the black light. Temperature 68° F. Camp surrounded by forest, primarily Sal. Condition of the ground still moist. Elevation 630 meters. 350 specimens.

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STOP 59 - BIHAR:
5 MI. S.E. NETARHAT
XI-11-61

Driving up the escarpment slope of the hills toward the town of Netarhat, we stopped in an area representing more or less the undisturbed flora of the region. The forest was composed of a number of species besides Sal. Most of the specimens were taken in fields of grass and Xanthium bordering the forest. Ground moist; sunny mid-day. Altitude 1000 meters 400 specimens.

STOP 60 - BIHAR:
NETARHAT XI-11-61

A quick afternoon stop in a garden planted with many flowers and shrubs in blossom. Vespids collected at flowers. Forest nearby nearly pure Sal, probably planted. Weather warm and sunny.
Elevation 1100 meters 50 specimens.

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~~STOP 61 - BIHAR:~~
~~3 MI. N. KODARMA~~
~~XI-12-61~~

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STOP 61 - BIHAR:
BARHI XI-12-61

A quick stop in the hills just outside Barhi, near the Tilaya Dam. Collected briefly under stones — old granite, schists, et. Dry, rather barren hills, supporting some Sal and other trees. 450 meters 75 specimens

STOP 62 - BIHAR
3 MI. N. KODARMA
XI-12-61

Stopped for an afternoon and night in the hills near KODARMA. Geological formation very ancient, composed of old weathered schists and granites, interspersed with occasional mica deposits. Soil still moist under stones, though the forest showed the effects of the approaching cool, dry season. Forest varied - Sal and others. Evening temperature about 60° F
440 meters 300 specimens.

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STOP 63 - BIHAR:
DEHOUR FOREST
XI-13-61

Near Rajauli, and closer to Dehour, is a hill region containing the Dehour Forest reserve plot, a section of excellent forest near a stream. Hillside

under the trees covered with an abundance of granite stones. Warm, sunny afternoon.
220 meters 100 specimens

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STOP 64 – BIHAR:
PUSA FARM
XI-14-61

Several miles north of Samastipur is the agricultural research station of Pusa Farm, situated in the flat Ganges Valley 100 meters in elevation. We stayed 2 nights and a day at Pusa; our camp was located in a garden area not far from a small river. The collecting areas were entirely disturbed — planted areas, etc. Weather during the day — clear and warm. Evening temperature - 70° and lower.
1700 specimens

STOP 65 – BIHAR:
RAXAUL XI-15-61

Camped one night in the compound of the mission hospital, surrounded by buildings and spacious garden. Surrounding countryside typical Ganges Valley — cultivated and densely populated. Elevation 180 M.
200 specimens

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## NEPAL

STOP 66 – NEPAL:
13 MI. N. BIRGANJ
XI-16-61

Driving north on the Kathmandu road, we stopped for an hour in an excellent stretch of typical Terai forest — sal and many other species. The forest understory was either small bushes or grass. Collected also in open grass meadows and sandy areas. Sunny, warm afternoon. Forest

Condition fairly dry. Elevation 200 meters. 400 specimens.

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STOP 67 – NEPAL:
HITAURA XI-17-61

Some 34 miles from Birganj, on the Nepal border, the Kathmandu road passes through the little town of Hitaura, situated in a fairly flat little valley, heavily forested. Camp located in a disturbed area near some buildings and ploughed fields. No trees to speak of near dry. Evening very cool. Elevation 550 meters, representing the lower reaches of the pine zone (the hills rise more steeply north of Hitaura) 150 specimens.

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STOP 68 – NEPAL:
KATHMANDU XI-19-61

Collected in two distinct areas near the city of Kathmandu, both 4500 ft. in elevation. One area, composed chiefly of rice terraces and grass along the river, was especially productive for sweeping. The rice had been harvested, leaving only stubble. Blossoming bushes between the paddies were visited by vespids, ichneumonids, etc. The second collecting spot was a sacred forest plot, situated on a slight knoll in the cultivated valley. Such sacred sections represent the last remaining natural vegetation in heavily cultivated regions. Vespids visited scale-covered trees while grasshoppers were collected in small meadow areas. The weather during the day was sunny and warm though the nights were quite chilly (48°-50°) in comparison, accompanied early each morning by fog.

1800 specimens.

STOP 69 - NEPAL:
3 MI. N.E. PALUNG
XI - 22 - 61

A short morning stop along the Kathmandu road 1840 meters in elevation. Collected on a well-grazed grassy slope on which grew a few scattered pines. Alcohol specimens were collected primarily under many stones lying about on the slope.
150 specimens.

---

STOP 70 - NEPAL:
HITAURA XI - 23 - 61

Camp located on the same plateau as STOP 67 (550 meters). Nights cool, collecting poor.
100 specimens

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STOP 71 - NEPAL:
9 MI. W. HITAURA
XI - 23 - 61

Collected a day and evening down the Rapti Valley, a thinly populated valley which has largely escaped the saw and plough. There are, nevertheless, large plots of cleared or partially cleared land on the valley floor which now grow mustard seed and other crops. The hills have been disturbed least of all and remain covered densely with a forest of large trees (Sal and others). We collected mostly on the valley floor near the foot of the hills, either in the forest, in the tall grass and shrubs near the river, or along the sandy river banks itself. The weather during the day was warm and sunny. Camp located at the edge of the stream so that the light drew from the forest as well as the water. A cool breeze came up not long after nightfall, however, and collecting was quite slow. Also, a full moon shone.
EL. 400 meters 1500 specimens.

UTTAR PRADESH (see also stops 102, 103.

STOP 72 - U.P.:
KANPUR XI-28-61

All specimens were taken in Allen Forest, just next to the Government Agricultural College. The area, though fairly small, has been left in a fairly natural state for some time; the weeds and vines have therefore formed a considerable understory beneath the old trees. Warm, sunny afternoon. Elevation 150 meters 1700 specimens.

---

STOP 73 - U.P.:
12 MI. S.W. BAREILLY
XI-29-61

Collected in an entirely disturbed area part of which was under cultivation (jute, etc.). Sweepings were taken in grass in a mango grove. 190 meters 1500 specimens.

STOP 74 - U.P.:
BHOWALI XII-1-61

Collected on the pine-covered ridges above Bhowali. Most specimens were taken under oak bark and stones. Weather was cold at night, clear and sunny during the day. Best stone collecting developed on sunny slope exposures. 1800 meters 150 specimens.

---

STOP 75 - U.P.:
10 MI. N. KATHGODAM
XII-1-61

Specimens taken in a mixed forest — pine and sal primarily — under stones and bark on steep slopes. The soil on shady exposures was cold and wet while that on sunny pine exposures was rather dry. Some specimens were collected in grass and herbage near the road — somewhat of a cleared slope. 1240 meters 250 specimens.

STOP 76 — U.P.:
KICHHA XII-2-61
310 meters.
Just near the base of the foothills there is a section of terai-type forest. The ground cover is primarily tall grass. Conditions were quite dry and general collecting was slow; bark collecting was excellent in old fallen trees, however. 1500 specimens.

---

STOP 77 — U.P.: DEHRA DUN
XII-9-61 700 meters
Specimens collected in close proximity to buildings. Alcohol material taken under flakes of bark on garden trees. Weather partially cloudy and cool all day. 200 specimens.

---

STOP 78 — U.P.:
5 MI. S.W. DEHRA DUN
XII-9-61
Camped and collected in an old native sal forest 600 meters in elevation. Grassy meadow and a large pond nearby. Most specimens were taken under flakes of bark on forest trees, under stones, dung, etc. 250 specimens.

---

STOP 79 — U.P.:
11 MI. S. MUSSOORIE
XII-10-61
Driving up the Dehra Dun-Mussoorie road, we stopped to collect on the steep rocky slope 1200 meters in elevation. Conditions on the sunny exposure were very dry. Chief vegetation — shrubs scattered about on the rocky slope among large Euphorbia bushes. Old decaying once-succulent Euphorbia branches produced weevils and some small burlesa material. 150 specimens.

---

STOP 80 — U.P.:
2 MI. S. MUSSOORIE
XII-10-61

A short afternoon stop 1800 meters

in elevation on a steep oak-covered slope. Grass dried and ground also very dry. Collected primarily under stones. 150 specimens.

---

STOP 81 – U.P.:
14 MI. S.W. DEHRA DUN
XII – 11 – 61
Specimens taken in a mixed forest (though predominately Sal) just at the base of the hills. Most material was collected under stones. Conditions in the forest and grassy fields were quite dry.
525 meters 200 specimens.

---

## PUNJAB (see also stop 100)

STOP 82 – PUNJAB:
3 MI. S. AMBALA
XII – 11 – 61
A brief stop along the road. Collected under stones and dung beneath a grove of acacia trees. Ground very dry and dusty.
350 meters 100 specimens

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## WEST PAKISTAN

STOP 83 – WEST PAK.:
LAHORE XII – 13 – 61
250 meters
Specimens were taken under stones in an old park adjoining the zoological gardens. Ground condition was moist. 75 specimens

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STOP 84 – WEST PAK.:
3 MI. N. KAMOKI XII – 14 – 61

Kamoki is a large brick village about 10 miles south of Gujranwala, on the Lahore – Rawalpindi Road. Specimens taken in a grove of trees in the midst of rather dry agriculture. 265 meters
75 specimens

---

STOP 85 – WEST PAK.:
4 MI. N.W. KHARIAN
XII – 14 – 61 350 meters

Collected in a low range of hills under stones and bark. The old uplifted, soft sediments were heavily eroded, and the only vegetation consisted of sparse grass and several species of thorny bushes. Ground nearly dry under stones. 250 specimens.

---

STOP 86 - WEST PAK.: 13 MI. N.W.
JHELUM XII - 15 - 61 350 meters.

Four miles N.W. the little village of DINA lies on old range of hills, uplifted sediments and river gravels. The countryside, possibly through manmade destruction of an ancient forest cover, is now heavily eroded into a series of deep canyons and arroyos - a semi-desert badland. The only vegetation is grass and thorny shrubs. Specimens taken under stones primarily. Ground slightly damp, especially on shady

STOP 86 - in BATALI DHER FOREST, SOHAWA RANGE

exposures. 250 specimens

---

STOP 87 - WEST PAK.:
5 MI. S.E. RAWALPINDI
XII - 15 - 61 500 meters

Specimens taken under stones in an old hill range consisting of uplifted riverbed conglomerates and strata of sand. The rugged canyons are rapidly crumbling away; vegetation sparse - grass here and there between an occasional thorny bush. Ground under stones fairly moist, especially on shady exposures. 150 specimens.

---

STOP 88 - WEST PAK.:
12 MI. N.E. RAWALPINDI
XII - 16 - 61 650 meters.

Specimens taken on a rainy day on the Rawalpindi - Murree road. Countryside hilly and rocky; vegetation cover primarily scrubby bushes, varied by small trees (wild

olives and others). Ground wet from the rain. 200 specimens.

---

STOP 89- WEST PAK.:
20 MI. NE RAWALPINDI
XII - 16 - 61 850 - 950 meters

Countryside similar to that of stop 88, though the hills here were steeper and more rocky. Shrubs were replaced by larger trees 10 - 15 feet high, olive being the primary species. Specimens taken under stones. Ground wet.
300 specimens.

---

STOP 90- WEST PAK.:
MARGALA PASS, NR.
TAXILA XII - 17 - 61

Specimens collected under stones near the General John Nicholson Memorial in the pass. The slopes of the hills were sparsely covered with clumps of grass and small xerophytic bushes. Ground under stones was moist from recent rains.

625 meters 250 specimens

---

STOP 91 - WEST PAK.:
ATTOCK XII - 17 - 61
360 METERS

An ancient graveyard on a barren shale slope overlooking Attock's historic Mogul fort was the locality for these under-stone specimens. Small, scattered clumps of grass comprised the only vegetation. The soil was slightly moist about 3 inches below the surface. Sunny exposure. 250 specimens

---

STOP 92- WEST PAK.:
8 MI. E. PESHAWAR
XII - 18 - 61
NOTE - SPECIMEN LABELS BEAR THE DIRECTION "SE" - DIRECT "E" IS CORRECT.
Collected under stones and in the grass in a typical "roadside plantation", a strip of trees planted

along the Grand Trunk Road. Brisk, clear winter day; ground moist. 350 meters 100 specimens.

---

STOP 93 - WEST PAK.:
10 MI. S.W. KOHAT XII-19-61

Collected along the KOHAT - HANGU road at the junction of the MARAI PAYAN road. The area is located in the (KOHAT) valley basically, though we collected adjacent to some small hills, rather bare mounds sparsely clothed with small xerophytic bushes. Some specimens were taken under stones along nearby planed fields. Ground moist. 650 meters. 250 specimens.

---

STOP 94 - WEST PAK.:
2 MI. W. CHERAT XII-20-61
1200 meters.

Cherat is located on a ridge in a crumbling range of red slates. The slopes around Cherat are covered with small wild olive trees, thorny shrubs, and clumps of grass. Specimens taken under stones on a little ridge 2 miles road distance down the hill from the town. Ground — that is, crumbled slate — moist, especially on the northern exposures where frost still lingered by mid-morning. Millepedes collected in the moist areas on the shady slopes. 250 specimens.

---

STOP 95 - WEST PAK.:
6 MI. W. CHERAT XII-20-61
900 meters.
250 specimens.

— A short stop located on the Cherat road about 3 miles east of DAG, a small mud and stone village. The slopes of slate hills (those of stop 94) were covered with a scanty fauna of spiny shrubs and a few wild olives. Conditions of soil and aspect like those of stop 94.

STOP 96 - WEST PAKISTAN:
TORKHAM XII - 21 - 61
750 meters.

Collected briefly under stones on the Pakistan side of the Afghanistan border, in the west end of Khyber Pass. Specimens taken in close proximity to the gravely stream bed. Sandy ground dry. The pass itself bisects ~~[illegible]~~ rugged, bare slate hills. Weather clear and cool. 100 specimens.

---

STOP 97 - WEST PAK.:
NRATTOCK XII - 22 - 61
300 METERS

While stop 91 was located on the east side of the Indus at Attock, stop 97 was on the west side. Specimens were taken under stones in a grassy field near the road and on a rocky slope covered sparsely with clumps of grass. Soil conditions in the area were quite different from those of stop 91; instead of a dry ridge, the spot was a more shady, moist slope, and slate was less prevalent. 200 specimens.

---

STOP 98 - WEST PAK.:
TAXILA XII - 22 - 61
550 meters. 250 specimens.

Taxila, a series of ancient ruined cities (some dating to 7TH century B.C.), is located in a small valley on the west side of Margala Pass. The archaeological sites are for the most part situated on large earthen and stone mounds which are surrounded by cultivated fields. The specimens were collected under the stones on or near the grassy slopes of the CHIRTOPE site. Soil moist.

STOP 99 – WEST PAK.: RAWAT
XII-23-61 600 meters.

Rawat, a mud-walled village on the Grand Trunk road between Rawalpindi and Sohawa, is the sight of Rawat Fort, an old stone ruin consisting of a large tomb (MAQBRA'S?) and the graves of warriors. The fort dates back to the mid fifteen hundreds. The specimens were collected under stones around the fort itself. The surrounding area was fairly dry and entirely disturbed by agriculture. The immediate vegetation included a ground cover of small grasses and a few thorny trees (Leguminosae). Ground moist or slightly so. 200 specimens.

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STOP 100 – PUNJAB: AMBALA XII-25-61
350 meters 75 specimens –
Roadside trees, grass-covered ground, much like stop 82. Specimens taken



under stones and tree bark.

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STOP 101 – NEW DELHI, INDIA
XII-30-61 260 meters

The ARAVALLI RANGE, an ancient axis of hills now ~~were~~ heavily eroded remnants of a once much larger range, extends its northernmost finger directly into the city of New Delhi and is known there as DELHI RIDGE. The vegetation is of course heavily disturbed by man, but scattered thorny bushes and some grass and weeds have escaped the axe and the ox. Specimens were collected under stones in a region of the gentle ridge not far from Palam Airport. Ground dry or slightly moist.

150 specimens

---

STOP 102 – U.P.: KITHAM LAKE
N.R. 11 MI. W. AGRA XII-31-61
200 meters
350 specimens.

Kitham lake is located in a large area of preserved forest, consisting primarily of thorny, acacia-like leguminous trees. Specimens taken under bark and stones (though stones were scarce). Membracids collected on sucker twigs of the tree species itself. Conditions of the forest — very dry.

---

STOP 103 — U.P.: NAGLA BIRBHAN, 30 MI. S.W. AGRA I-2-62
240 meters

Southwest of Agra, and 16 miles S.W. the small town of KAGAROL, there are two or three parallel NE.-S.W. ranges of low hills composed of hard red sandstone which in past centuries was transported to Agra and other cities, hewn into blocks, and used in the construction of great monuments — AKBAR'S TOMB, the TAJ MAHAL GATES, etc. The hills are only narrow, rounded ridges rising out of the surrounding plain. That conditions there are fairly dry the year around is illustrated by the xerophytic, thorny, low-growing shrubs and small-leafed, thorny DHOE trees which comprise the sparse flora on the rocks-strewn hills. Specimens collected exclusively under stones. Ground dry. 300 specimens.

(NAGLA BIRBHAN = NAME OF HILL RANGE)

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## RAJASTHAN

ALTERNATE SPELLINGS — MAHWA, MOHWA

STOP 104 - RAJASTHAN: MAHWAH I-5-62
280 METERS

Just on the outskirts of town, on the Barathpur - Jaipur road, an ancient, crumbling stone castle, situated atop a small remnant Aravalli hill, constituted a short stone-turning stop. Ground conditions were very dry. Vegetation — small grasses.
250 specimens.

STOP 105 – RAJASTHAN:
DAUSA I-5-62
1650 feet.

Dausa (~~also~~ sometimes spelled DAOSA) is located near one of the many parallel ridges of the old Aravalli range. Specimens taken under stones at the base of hill. Vegetation – scattered shrubs, grasses, small legumes, and Euphorbia bushes. Conditions very dry. 350 specimens

---

STOP 106 – RAJASTHAN:
HILLS E. JAIPUR I-6-62
450 METERS
450 SPECIMENS

Collecting was productive under stones in these dry, semi-arid, rocky hills, supporting only Euphorbias and other thorny xerophytes. Specimens were taken along the road to the Sun Temple, a ~~road~~ branching off of the Barathpur – Jaipur road in the pass just E. of town. The eastern slopes of the hills in this area are thickly clothed in sand while the western slopes are rocky and blown bare of sand. Thorny trees seem to prefer the western exposure more than the eastern; the reverse is true for Euphorbia. Specimens were collected on both slopes and one vial (marked) of beetles, etc., was filled with insects under stones in a moist, shady spot. Ground conditions were dry elsewhere.

---

STOP 107 – RAJASTHAN:
KISHANGARH I-7-62
450 METERS
250 SPECIMENS

Specimens collected under stones on the gentle slopes of an old Aravalli ridge just N.E. of town. Vegetation consisted of Euphorbias, some low-growing herbs and grass which were quite dry and brown.

ground very dry. Warm, sunny exposure.

---

STOP 108 - RAJASTHAN:
5 MI. W. BEAWAR I-7-62
500 METERS
350 specimens.

This Aravalli ridge near Beawar is more rugged than the last. The steep slopes are composed of large granite boulders worn smooth from centuries of weathering. Here and there, in little gullies of granite sand, or on flat places, a few loose stones proved productive. Euphorbias and small thorny bushes were the plants chiefly seen there. Conditions extremely dry.

3 MI. E. OF THE
LITTLE TOWN OF SENDRA -

---

STOP 109 - RAJASTHAN:
BARR I-7-62 450 METERS
200 specimens.

This one-night camp was located in a soil conservation research plot N.E. of BARR, on the Beawar - Pali route. The area is ungrazed; a rich cover of grasses and herbs, dry and brown in January, grow on the rocky ground of the gently rolling hills. The semi-desert conditions are exemplified by succulent Euphorbias and thorny xerophytes. Specimens were collected under stones (with the exception of a few moths and diptera which came to the light at night). Ground dry. Night cool.

---

STOP 110 - RAJASTHAN:
HILL S. PALI I-8-62
275 meters

The hill on which these specimens were taken is unmistakeable. An isolated remnant of an Aravallis ridge, it rises steeply out of the surrounding flat desert and, being the only high place near Pali, town of the fairs, has

been ordained SACRED. A fancy temple now crowns its summit. A large, shallow lake lies to the south. The vegetative "cover" consists of scattered Euphorbia and thorny bushes on the hill, some scattered grass and larger bushes on the flatland. Most specimens were collected under rocks.

HOT, DRY DAY. 350 specimens

---

STOP 111 - RAJASTHAN:

5 MI. N.E. SUMERPUR I-8-62

350 meters.

A quick roadside stop in the flat valley between parallel Aravalli ridges. Specimens taken under stones where the ground was very dry.

200 specimens.

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STOP 112 - RAJASTHAN:

3 MI. S.E. SIROHI I-9-62

450 meters.

Specimens taken primarily under stones along the road across the range of hills to the east of Sirohi. Conditions were quite dry; what little grass and herbs there were on the rocky ground had been dry for some time. A few large milkweed bushes bloomed on, however; many thorny bushes and a few trees also grew on the hill slopes. Ground dry; weather sunny and warm. 200 specimens.

SOIL & ROCKS - GRANITIC.

---

STOP 113 - RAJASTHAN:

E. SLOPE, MT. ABU I-9-62

400 METERS.

The eastern exposure of the Mt. Abu range showed all the signs of the dry winter season. The forest of small, deciduous trees was bare while a few thorny evergreens remained foliated. The rocky slopes were clothed with a good cover of dry grass. The ancient Aravalli formation is all granitic in this area, though a fair layer of soil covered much of the rock in most places

other than granite outcrops. Granite boulders and stones scattered around in the grass provided good collecting. Ground very dry. Weather sunny and warm
300 specimens.

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STOP 114 - RAJASTHAN:
E. SLOPE, MT. ABU I-9-62
750 METERS

The geology here is much the same as that of stop 113 — primarily granite. The soil layer is deeper and the forest larger, however. A thick layer of dry grass and Xanthium covered the ground beneath the trees. Soil very dry. Weather warm and sunny. Most specimens taken under stones and bark or in the dry grass.

200 specimens.

LOCATED IN THE CHHIPA BERI FOREST RESERVE BLOCK, about 9 miles by road below the town of Abu.

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STOP 115 — RAJASTHAN:
E. SLOPE, MT. ABU I-10-62
1100 METERS.

Driving farther up the mountain road we stopped briefly about 3 miles below Abu town. A small stream trickled down the steep slope, and a little pool provided some aquatic collecting. Because of the little canyon situation both shady and sunny exposures were available. Most specimens, however, were taken under stones on the shady slope or near the stream where the ground was moist. The forest was little different from that of the previous stop, though a large number of wild mangos replaced some of the lower elevation species. Weather warm and sunny.
250 specimens.
The appearance of Euphorbias was also characteristic of this zone.

STOP 116 – RAJASTHAN:
ABU, I-10-62
1200 METERS

The little town of Abu is located on a gently rolling plateau near the top of Mt. Abu itself. The forest around the town is not as thick as the forest lower down, perhaps because of drier conditions, but also because of woodcutters. Euphorbia and thorny bushes replace some of the larger trees, though many old mango trees grow in town and around the lake there. Most specimens were taken visiting flowers or browsing about the vegetation surrounding the lake. Weather warm and sunny. 100 specimens.

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## GUJARAT

STOP 117 – GUJARAT:
13 MI. W. GODHRA I-11-62
150 METERS

A quick roadside stop in a dry, thorny, scrub forest of acacia-like trees and some larger evergreens. The black cotton soil was deeply cracked and very dry. Countryside fairly flat. Specimens taken primarily under stones 100 specimens

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STOP 118 – GUJARAT:
4 MI. E. GODHRA I-12-62
175 METERS.

Near the little railroad station of CHANCHELAO there is a steep granite outcrop rising out of a plains forest. The trees were being heavily cut by loggers, leaving large areas of the flatland nearly bare of cover. Specimens were taken primarily under granite stones around the outcrop.

The soil was very dry.
200 specimens.
(MOUSE STOP)

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STOP 119 — GUJARAT:
13 MI. W. DOHAD
I-12-62 300 METERS

West of Dohad there is a 14-mile-wide forest section consisting almost entirely of teak. The gently rolling countryside bore all the signs of the dry season; the grass was brown and the teak trees were nearly bare of leaves. Specimens were collected under stones in a thick forest near the little railroad station, MANGAL MAUDI. The ground was dry and deeply cracked 200 specimens.

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MADHYA PRADESH

STOP 120 — M.P.: 6 MI. N.W.
BAGH I-12-62 360 METERS
100 specimens.

A short stop on the top of a lava plateau provided some collecting under volcanic stones (basalts, etc.). The soil cover was deep in some places and deciduous trees were scattered about the area. Conditions were extremely dry and the hard soil was deeply cracked.

---

STOP 121 — M.P.: 6 MI. N.E. TANDA
I-13-62 550 METERS
200 specimens.

On the road from Bagh to Sardarpur there are ghat sections composed of ancient lava flows, now worn down into small ranges and plateaus. A fair soil cover conceals much of the lava and in some places a fairly thick deciduous forest is able to grow. These specimens were collected in such a spot — where teak was the primary species.

The soil, like the black cotton type, was quite dry and deeply cracked. Most insects, spiders, etc., were collected under stones (lava, opal, quartz). Hot, sunny day.

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STOP 122 – M.P.: 5 MI. S.W. MANPUR
I-13-62 480 METERS
150 specimens

Manpur is located on the Delhi-Bombay trunk road between Mhow and Khalghat. At this point there is a ghat or hill section consisting of a remnant of the old lava flow once continuous over an immense area. A good soil cover supports grass and a young teak forest. Specimens were taken under stones. Ground dry, grass brown.

(CAVAGNARO SNAKE UNDER STONE)

STOP 123 – M.P.: KHALGHAT
I-13-62 200 METERS

(also seen on some maps as PHALGHAT). Camp was located in the rest house compound on the south bank of the Narmada River. A variety of small diptera and aquatics came to the light at night; the evening was warm and slightly breezy. A number of specimens were also collected under stones on a nearby hill. The ground there was quite dry and the sparse cover of grass and herbs was entirely brown. A few large trees grew near a village and collecting was especially good under the stones in the shade. The black-cotton soil was hard and deeply cracked. 250 specimens.

~~STOP 124 - M.P.: 8 MI. S.W.~~

STOP 124 - M.P.: JULWANIA
I - 14 - 62 300 METERS

On the northeast side of town the Bombay - Delhi road passes through some gently-rolling ghat country consisting of volcanic formations, remnants of ancient lava flows. These specimens were collected under lava stones on a dry, grassy slope where no trees were growing. The exposure faced the sun and the ground was very warm. The black cotton soil was deeply cracked and many insects had retreated down into more cool regions of the ground.
100 specimens.

(MOVIE OF COLLECTING ON SLOPE)

STOP 125 - M.P.: 8 MI. S.W. SENDHWA
I - 14 - 62 580 METERS

Stops 125 and 126 were located in the Satpura Range area, a series of lava flow remnants now worn down into rolling, tree-covered hills and ridges. The dry slopes here were covered with a fairly thick teak forest. The grass was brown, the trees bare of leaves. Specimens were collected under stones; black cotton soil was heavily cracked. 100 specimens.
(MOVIES - WALKING THROUGH LEAVES)

STOP 126 - M.P.: 10 mi. S.W.
SENDHWA I - 14 - 62
~~400~~ meters
380

Here the trunk road crosses the M.P. - Bombay State border. The forest ~~has~~ consists of a large variety of deciduous and a few evergreen trees, most of which have reached a large

size. In spite of good shade in some parts of the forest the ground was very dry. The black-cotton soil bore deep cracks. Specimens were taken under stones and dry bark
100 specimens
(HURT THUMB STOP)

## BOMBAY STATE

STOP 127 - BOMBAY:
17 MI. N.E. MALEGAON
I - 15 - 62 400 METERS

Here the Delhi - Bombay trunk road passes through an area of lava ghats, a series of flow remnants forming mesas and plateaus. A layer of red soil, having the texture of the black-cotton type, supported some grass and thorny bushes. The dry, cracked ground was warm even beneath large lava rocks.
200 specimens.

STOP 128 - BOMBAY:
3 MI. N.E. CHANDOR
I - 15 - 62 800 METERS

The ghats in the Chandor area, typical Deccan lava flow plateaus, support a thicker vegetative cover than those in the Malegaon section. Collecting on the slope at the base of a lava escarpment, we turned stones among lantana and euphorbia. The hard black-cotton soil was dry and cracked. 100 specimens

STOP 129 - BOMBAY:
OJHAR I - 15 - 62
600 METERS

About 150 specimens of moths and delicate diptera were collected at the light on a warm evening. Surrounding countryside — dry, open plateau agriculture.

STOP 130 - BOMBAY:
3 MI. N.W. SINNAR
I-16-62 780 meters
250 specimens
These specimens were collected in barren lava plateau country under stones. The soil supported a cover of grass but few bushes grew about the lava slopes. Black-cotton soil was cracked and dry.

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STOP 131 - BOMBAY:
15 MI. S.E. SINNAR
I-16-62 780 METERS
250 specimens.
The Nasik - Poona road passes through a lava ghat area at this point. These specimens were collected under stones on the sunny slope at the base of a lava escarpment. The countryside was typical Deccan plateau type, with hard, black-cotton soil, euphorbia bushes, and other thorny plants.

STOP 132 - BOMBAY:
4 MI. N. KHED I-16-62
780 ~~820~~ METERS
About 75 specimens were collected under stones in a hot, dry canyon on the sunny side of Peth Ghat. Some thorny trees and a cover of brown grass were the chief components of the flora

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STOP 133 - BOMBAY: 500 M.
KHANDALA I-19-62
~~600~~ METERS (500 meters after altimeter CHANGE ~~and Comment after STOP 132~~)
The pleasant hill station at Khandala is situated on a flat volcanic plateau just at the edge of the Bhor Ghat. On the west and north, where centuries of erosion have chewed through the thick lava flows, the cliffs drop off steeply to the coastal lowland strip in a series of steep cliffs and ledges.

(Have been adjusted)

NOTE: "Bombay" was an old state whose name and boundaries have recently been changed. MAHARASHTRA should be added in the place of Bombay - stops 127-133

These specimens were collected under stones in fairly open country marked by scattered patches of trees. A good growth of grass, dry and brown, covered the cracked black-cotton soil.

The forest on the escarpments in the Khandala area show a peculiar distribution governed by the lava stratification. Evergreen forest strips alternate with deciduous bands and latitudes of harder rocks supporting only scattered clumps of grasses. The clumps of trees on top of the plateau seem to be mixed evergreen-deciduous.

500 specimens.

STOP 134 - 20 MI. N. BOMBAY, INDIA I-21-62 METERS 50

400 ~~400~~ specimens

KRISHNAGIRI NATIONAL PARK is located in a group of old volcanic hills north of Bombay proper. Manwade VIHAR LAKE fills a large depression in the center of the park between the hills. The flora of the park's northern end consists of many species of evergreen and deciduous trees forming in places a dense forest cover. Vines and clumps of bamboo also indicate a fair rainfall during the monsoon. Toward the south end, somewhat lower in elevation on the average, the forest thins out and ~~became~~ interfingers with a stand of Borassus palms. The dry, cracked ground was covered with a carpet of brown grass in some places, of fallen leaves nearly everywhere. Most specimens

were collected under stones, bark, or rotting wood. One large vial of aquatic insects was filled from a small creek and stagnant ponds. Many interesting wasps, flies, and beetles were swept from the evergreen foliage of bushes growing in the damp creekbed.

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STOP 135 - BOMBAY, INDIA
I - 20 - 62
elevation, for all practical purposes - sea level. 3 M.

About 850 specimens were collected in the cultivated garden of the HAFFKINE INSTITUTE in the heart of the Parel district of Bombay. The large majority of the specimens were collected by beatings from a dead, fermenting tree, still standing in the garden. The bark covered a thick layer of damp, chewed wood; some parts were still very wet but contained a huge population of weevils and fly larvae nevertheless.

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STOP 136 - BANDRA, BOMBAY
INDIA I - 23 - 62
sea level to 60 feet.

Bandra is a pleasant residential district on the west coast of Bombay Island several miles north of Bombay proper. The area is almost entirely built up and disturbed, though many of the native trees remain in cultivated gardens. Here and there "weedlots" have escaped human habitation though goats and cattle have played havoc with the grass. In such places, beneath mango trees and palms, these specimens were taken. Stone collecting was most profitable. Conditions were for the most part very dry.

250 specimens.

SALSETTE ISLAND AREA

STOP 137- MAHARASHTRA:
KARLA CAVES I-25-62
600 METERS

The ancient Buddhist caves at Karla are situated in a vertical cliff at the exposed end of a particularly thick, hard layer of basalt. Below this layer the slope drops away more gently onto the plain (or valley) These specimens were collected under stones where the incline was more gentle. Scrubby, thorny shrubs and grass comprised the chief flora; euphorbia was also common in that area. The surrounding countryside was typical Deccan lava type. A light sprinkle the night before had dampened the surface of the ground, but beneath the stones, scarcely 3 inches below the surface in fact, the ground remained dry. Honeybees had constructed a tremendous open comb on the ceiling of the cave entrance

itself. 200 specimens.

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STOP 138 — MAHARASHTRA:
8 MI. N.E. SIRUR I-26-62
700 METERS 200 SPECIMENS

Here the Deccan trap topography was clothed in little more than grass, due more likely to historic than to geologic reasons. Specimens were taken under stones near the broken, eroded edge of a lava plateau. Soil was quite dry.

STOP 139 - MAHARASHTRA:
DAULATABAD I-27-62
625 METERS

Daulatabad Fort is an unmistakable landmark seen for many miles around. The walled fort covers an extensive area at the base of a steep-sided hill on top of which another stronghold was built. Lava ghats rise up in typical plateau fashion about a mile beyond the hill. These specimens were collected primarily under stones along the foot of the outer fort wall nearest the ghats — where their lower slopes begin, in fact. A few large trees and tangles of lantana and other bushes grew about the area. The grass was grazed off. Conditions were extremely dry and the soil was deeply cracked. Some bees were collected at flowers.

450 specimens.

STOP 140 - MAHARASHTRA:
AJANTA CAVES I-28-62
500 METERS

About 150 specimens were collected under stones at the base of the lava cliffs and slopes some distance down the canyon from the caves. A thick forest of deciduous trees mixed with evergreen, small-leaved thornbush covers all of the volcanic slopes except the cliffs of resistant basalt. The grass beneath the trees and in open spots was of course brown and dry but was also ungrazed. In fact the flora on the whole looked untouched. Ground cracked and very dry.

---

STOP 141 - MAHARASHTRA:
3 MI. W. EDALABAD I-28-62
240 METERS 350 specimens.

At this point the Dhulia-Nagpur road passes near some low rolling lava hills covered with a thin forest of mixed deciduous and thorny evergreen trees. The dry ground was well covered with dry grass. Specimens were collected primarily under stones.

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STOP 142 - MAHARASHTRA:
2 MI. E. KONDHALI I-29-62
440 METERS

Kondhali is located in Deccan trap country west of Nagpur. These specimens were collected under lava stones in a low ghat section covered primarily with young teak trees. The soil was very dry and cracked.
200 specimens
(FOX STOP).

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STOP 143 - MAHARASHTRA:
6 MI. E. BHANDARA I-30-62
200 METERS.

A gently rolling patch of slate and quartz knolls ~~[illegible]~~ is crossed by the Nagpur-Raipur road at this point. A fairly thick

forest of evergreen trees mixed with teak covers the hills. A large swampy lake lies to the south of the area. Stones are scarce, the soil is rather sandy and dry. Warm, sunny morning. 150 specimens.

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STOP 144- MAHARASHTRA:
3 MI. W. SAKOLI I-30-62
220 METERS
250 specimens.

The deciduous teak forests of the Deccan trap countryside give way to wholly evergreen forests some distance east of Nagpur. These specimens were collected in a mixed evergreen forest, though sal was ~~quite~~ the most common species. Rough lava stones were scattered about on the otherwise bare ground beneath the trees. Though the forest was extremely dry, heavy rainfall during the rainy season had left the ground beaten and packed, and many of the stones were left on small rises or pedestals of soil. Termites had consumed nearly all branches and stumps on the ground, the usual procedure in sal forests of this type. Topography was nearly lacking; the area was either flat or gently rolling.

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STOP 145- MAHARASHTRA:
9 MI. E. DEORI 340 METERS
150 specimens. I-30-62

A brief stop in a mixed evergreen forest on a rolling plain marked by occasional low hills. Soil sandy but well packed. Forest more open than that of stop 144, with frequent grassy, clear spots. Specimens collected primarily under stones. Conditions very dry.

MADHYA PRADESH

STOP 146 – M.P.: 10 MI. E. CHICHOLA
I-30-62 300 METERS
100 specimens

A few moths and a vial of small diptera were collected at the Tappa Rest House, located in a flat area surrounded by low hills, rather deforested by local villagers. Tappa itself is a small, tile-roofed village along the Nagpur-Raipur road. Mildly cool evening. Very dry area.

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STOP 147 – M.P.: 11 MI. S.W. DHAMTARI
I-31-62 340 METERS
200 SPECIMENS.

Low, broad, gently rolling hills covered with a mixed evergreen-deciduous forest. Trees small, affording only partial shade to the stony ground. Specimens collected under ~~stones~~ crystaline sandstone rocks primarily; ground sandy but well packed — very dry.

---

STOP 148 – M.P.: 4 MI. S. KANKER
I-31-62 360 METERS
1500 SPECIMENS

Kanker is located in a small valley among peculiar, eroded granite outcrops. These boulder hills are heavily forested with a variety of trees, mostly ever-greens. Though conditions were quite dry, there was evidence of a good rainfall average during the wet season. These insects were collected along a small creek in the valley itself, bordered by low forest and some very large acacia-like trees. The ground near the stream was moist though the forest itself was dry. Sweeping the wet sand and herbs, reeds, and grass along the stream bank proved

very productive

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STOP 149 – M.P.: 14 MI. S. KANKER, 450 METERS, I-31-62.

Dense, almost entirely evergreen forest of large trees and vines at the foot of a steep ghat section. An understory of bamboo in some places, young trees and shrubs and grass in others. Camp located in the forest along a small stream. The sides of the little valley were formed by granite hills strewn with exfoliating granite rocks which ~~were~~ had largely decomposed in places, forming a good layer of soil on the slopes. The ground beneath the stones was moist. Sandy granitic soil was found in the more gentle slopes, especially near the stream. Patches of forest had been cut to make way for the planting of young teak trees. Some bark Collecting was therefore productive. In one clearing, planted with teak seedlings, 12 inches high, grass and herbs had grown up; along the borders of this manmade meadow, in the shade ~~along~~ near small springs and creeks, sweeping yielded a large quantity of small diptera, coleoptera, etc. Weather during the day – warm and sunny, becoming cool in the evening, chilly by morning. 2000 specimens.

KESKAL village just at the top of the same ghat.

---

STOP 150 – M.P.: 9 MI. N. PHARASGAON, 580 METERS, II-1-62

Once over the granite ghats mentioned above, one enters upon a broad, gently-rolling plateau-like plain 500-600 meters in elevation, ~~[illegible]~~ the only emphasis on topography being an occasional low, forested granite hill. This was a quick roadside

Pharasgaon is sometimes spelled without an H.

stop near areas of "rehibilitation" work with primitive people, on the Raipur – Bastar road. The heavy, black soil was moist in the shade of ficus and other medium-to-large trees. The forest here was fairly cut up to afford crop room for imported tribes. Specimens were collected primarily in a large pond by sweeping through aquatic plants, leaves, and dead grass at the edges.
1000 specimens

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STOP 151 – M.P.: PHARASGAON, 550 METERS, II-1-62.

Sal forest on rolling plain. Soil moist – heavy, black, and well packed. Recently felled sal trees and branches were scattered about on the bare ground. Some patches of grass grew along the road.
250 specimens.

STOP 152 – M.P.: 4 MI. N. JAGDALPUR, 450 METERS II-2-62
300 specimens

Mixed evergreen forest – sal, ficus, etc., on a rocky knoll bordered by open, grassy fields and patches of lantana bushes – Soil, dry; warm, sunny day.
~~150 specimens~~.

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## ORISSA

STOP 153 – ORISSA: 8 MI. N.W. KORAPUT, 775 METERS II-2-62

(Note: specimen labels bear the direction W.; N.W. is correct).
Forested hillside bordered by planed fields. Many large mango trees. Specimens collected under stones in dense brush – lantana, etc.; some net-collected specimens from grassy fields nearby.
150 specimens.

STOP 154 – ORISSA: 3 MI. S.E.
POTTANGI, 3345 FEET II-3-62
1000 specimens.

East of Koraput the road begins to descend the loose collection of Eastern Ghats hills rounded and weathered, with exposed exfoliating surfaces of rock here and there showing through scrub jungle. The upper hill regions especially have in historic times been seriously deforested by shifting agricultural practices, though some of the more rocky hills no doubt never supported a dense forest cover. These specimens were collected on a grassy knoll near the road; a clump of trees shaded many stones and had built up a layer of leaf litter among them. The black, rather compact soil was very dry.

STOP 155 – ORISSA: 13 MI. S.E.
POTTANGI, 550 METERS, II-4-62

About 250 specimens were collected near the Orissa smuggling checkpost and rest house at SUNKI, located in a narrow valley on the monsoon face of the Eastern Ghats. The forest consisted of a large variety of evergreen and some deciduous trees; very old wild mango and large ficus grew about among thorny acacia-like species. In places on the steep slopes bamboo and thornbush thickets were impenetrably dense. Some flying and aquatic insects were collected along a small stream and adjacent plowed fields in the floor of the ~~narrow~~ valley. All other specimens were collected under stones on the greater hill slopes. A few small diptera and moths came to the light – night still and chilly. 250 specimens. Slopes partially shady exposure.

STOP 156 – A.P.: 6 MI. W. SALUR,
285 METERS, II-4-62
150 specimens

Extremely dry, rocky slope forested with small thorny trees and jungly vines; many species deciduous or semi-deciduous. Steep, sunny exposure on the eastern slope of the Eastern Ghats, not far above the Coromandel Plain.

—

The flora on the eastern slopes of the ghats shows a marked change from the plateau flora to the west. Heavy rainfall occurs during monsoon months; moisture-laden winds from the Bay of Bengal drop large amounts on the ghats, especially along their northern extremity. 8 months of the year are extremely dry, however, and the forest, on the rocky, exposed slopes especially, remains small (stop 156). In the sheltered canyons and valleys, where a thick layer of soil has accumulated, jungle conditions occur; mango trees grow to an immense size and vines drape themselves over their branches. Some of the creeks retain water nearly all year (stop 155).

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STOP 157 – A.P.: 8 MI. N.E. TUNI,
30 METERS, II-5-62
150 specimens.

Typical Coromandel countryside: flat coastal plain, scarred by agriculture, sporting occasional hillocks covered with low thorn bush (2-4 ft. high). These specimens were collected under stones on a rocky hill near Ramavaram village. Ground – somewhat sandy and very dry. Some insects were collected in a plowed (bare) field near a strip of palmyra and a grove of mango and cashews.
Warm, sunny afternoon; breezy.

STOP 158 - A.P.: 15 MI. S.W.
RAJAHMUNDRY, II-5-62
15 METERS
2500 specimens
Camp located in the compound of the P.W.D. rest house at PANGIDI village, ~~on the~~ about 8 miles from the western bank of the Godavari River. Surrounding country entirely disturbed by agriculture and mango groves. Large trees, a mango grove, and some "weed lots" near camp. The area was quite dry locally, though many little ponds and irrigation ditches marked the field areas not far away. Warm, still evening (75°F); specimens taken up to about 10 P.M.

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STOP 159 - A.P.: 5 MI. S.E.
ASHWARAOPET, 100 METERS.
II-6-62 500 specimens

Patch of original vegetation - dense forest of large and small mostly evergreen, some deciduous trees covered extensively with vines; understory of thorn scrub. Ground and bark quite dry. Some specimens were collected under the barks of a dead stump where some moisture was retained (especially under bark below ground level.) Countryside flat plain.

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STOP 160 - A.P.: 5 MI. W. ASHWARAOPET,
200 METERS, II-6-62
75 specimens were collected under stones; quick stop on a low hill covered with thin thorn scrub - many deciduous species. The rocks were a soft, gray mudstone and sandstone; the ground was gray and sandy but well packed. Conditions extremely dry.

STOP 161 - A.P.: 10 MI. E. KHAMMAM,
225 METERS, II-6-62
700 specimens.

Camp situated in the compound of the rest house at THANIKALLA. Surrounding landscape - disturbed agricultural land with occasional patches of mangos and dry, weedy fields. Some irrigated land near tanks or ponds, though conditions were otherwise quite dry. Warm evening (75° F); a breeze came up by 9 P.M., however, and light collecting dropped off.

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STOP 162 - A.P.: 4 MI. W. KHAMMAM,
100 METERS, II-7-62
150 specimens.

In the Khammam area the so called coastal plain is characterized by many hillocks of granite, outcropping steeply from gently rolling flatlands. The plain itself is much more dry and less farmed than ~~are~~ the regions nearer the coast. These specimens were collected under stones on the steep slopes of one hillock near Khammam; the vegetation consisted of clumps of grass between the rocks and ~~[illegible]~~ scattered thornbushes 2 to 3 feet high. The ground was dry in most places, slightly moist below the surface in the shade of large boulders.

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STOP 163 - A.P.: 2 MI. W. NARKATPALLI,
300 METERS, II-7-62
400 specimens.

Isolated granite hill in rolling plain countryside. Dry area, sunny exposure. Vegetation - low bushes scattered among large granite boulders; clumps of grass here and there. Soil - granitic decomposition type - sandy. Surrounding flatland - dry, weedy fields, some of which were tilled and planted

during the rainy season. No trees nearby. Specimens taken primarily under stones on the steep slopes of the hill and just at the base. Hot, sunny afternoon 90°F.

---

STOP 164 - A.P.: 10 MI. N.W. SHADASEOPET, 600 METERS.
II-8-62
200 specimens.
Low lava hill in the fringe of Deccan lava country. Grassy slopes spotted with a few small bushes and large chunks of scoria. Red-brown soil, very dry. Shady and partially shady exposures. Some specimens were collected about 1/2 mile S.E. under stones beneath a large banyan tree along the road, some near a little temple on top of the hill nearby. Hot, sunny day - 90°F.

MAHARASHTRA

STOP 165 - MAHARASHTRA: 20 MI. N.W. SHOLAPUR, 450 METERS,
II-8-62
Open Deccan countryside; village of MOHOL nearby. Specimens collected at the light in the compound of the Mohol Rest House from dark to about 9:30 P.M. Warm, still evening. A few trees grow about the compound; grass fields nearby. 100 specimens.

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STOP 166 - MAHARASHTRA: 5 MI. S.E. INDAPUR, 450 meters,
II-9-62 100 specimens.
Typical open Deccan plain, extremely dry in February. Quick roadside stop; specimens collected beneath broken basalt stones in the shade of roadside trees. Black ground dry but rather loosely packed.

call it POONA, INDIA

STOP 167 - MAHARASHTRA:
POONA, 1800 FEET, II-10-62
150 pl-c.

Specimens were collected in a yard compound, Ganesh Khind district. Surrounding area disturbed residential suburbs, characterized by gardens and trees.

A total of about 200 specimens were collected in Poona on three different occasions; only those collected II-10 bear stop number 167. Other lots are simply marked "Poona" followed by the corresponding date. Perhaps the month & day should be left blank on the label, to be filled in by hand. There are 3 different dates, the last being in Feb, the former 2 in Jan.

STOP 168 - MAHARASHTRA:
MAHABLESHWAR, 1250 METERS,
II-13-62

5000 specimens

This quaint "resort town", Poona's primary hill station, is situated on a gently rolling plateau of lava. These flows were laid down one on top of the other until a tremendous thickness of lava had been built up. Erosion has reduced them to scattered plateaus and a considerable range of ghats near the west coast. The vegetation on the steep eastern slopes of the ghats consists of grass (dry in Feb.), an occasional thornbush or euphorbia, and rarely a small tree. The eastern edge of the plateau itself is a continuation of the same dry flora. About 4 miles to the west, however, due to the rain shadow effect, the flora begins to

make an abrupt change. Grass gives way to more shrubs and ferns. Some 4 miles E. of Mahableshwar itself the scrub chaparel-type cover blends rather abruptly into a thick evergreen forest; a variety of trees, all small in stature, rarely exceeding 25 or 30 feet even in the creek gullies, constitute a forest which in almost every respect resembles the live oak forests near the coast of California — trunks and branches covered with mosses and lichens, ground covered with a thick mantle of leaf mold in some places. On the drier, more exposed knolls clumps of evergreen trees ~~were~~ interlaced with patches of grass field.

Specimens were collected in a variety of niches between 3 miles E. of Mahableshwar and the town itself. While the countryside does not change its character in that distance, certain microenvironments can be more easily reached along the way than in any one spot alone. Most collecting was done, however, in the vacinity of the LINGMALA forest rest house, located directly in the forest on a knoll overlooking a forest-clad valley. An excellent collecting trail, from the rest house down into the little valley, leads to a spectacular waterfall, the valley narrows and ends abruptly at an immense vertical cliff forming the upper end of a vast canyon. Aquatic collecting in the flowing stream and adjacent stagnant pools above the falls proved productive. The greatest bulk of specimens were collected by sweeping reeds and grass near the stream, or the shrub understory in the shade of the forest where even the ground was still damp.

Otherwise conditions were quite dry. Moist gravel beneath leaves along the edge of the stream yielded Collembola and many beetles. The boulders in the stream had the usual collection of stream-side diptera.

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## MYSORE

STOP 169 - MYSORE: 10 MI. N. BELGAUM, 800 METERS, II-15-62
200 specimens
Rolling plateau covered with primarily deciduous forest and grassy fields. Grass dry, trees bare, ground extremely dry. Hot, sunny day, 90° F. Stones scarce.

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STOP 170 - MYSORE: 2 MI. N.E. HALIYAL, 550 METERS, II-16-62
150 specimens.
Rolling plateau country — dry deciduous forest (teak, etc.) with scattered evergreen trees and roadside ficus. Plowed fields nearby, bare for lack of water. Conditions extremely dry. Rocks scarce.

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STOP 171 - MYSORE: 10 MI. S. HALIYAL, 500 METERS, II-16-62
150 SPECIMENS

Rolling, hilly plateau covered with a mixed forest of large deciduous and evergreen trees, peculiarly characterized by an understory of bamboo clumps 10-20 feet high. Dry ground littered with dead leaves and logs from minor felling operations.

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STOP 172 - MYSORE: 3 MI. N. YELLAPUR, 550 METERS, II-16-62
2000 specimens.
Low, rolling hills. The mixed deciduous-evergreen forest and its tangle of bamboo undergrowth suddenly gives way to an apparently

isolated patch of dense rain forest jungle — immense trees, tangled vines, and thick under-growth, ~~of~~ all evergreen. Though conditions were very dry, the annual rainfall is evidently quite high. Sweeping the foliage in filtered shade proved productive; a large number of specimens were collected in a section of rotting vine 4 or 5 inches in diameter, just at and slightly above ground level.
Warm, sunny day.

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STOP 173 - MYSORE: SIRSI, II-16-62
400 specimens. 600 METERS
Camp located in the compound of the forest rest house on a knoll surrounded by large native trees and fields of grass. Both morning and evening temperatures were 15° F. Collecting was good under logs in a dry, grassy field.

STOP 174 - MYSORE: TYAGLI, 500 METERS, II-17-62 -
300 specimens
Low hills — dense rain forest jungle, large evergreen trees and vines. Conditions for the most part very dry. Warm sunny day. Area located 1 mile south of KANSUR, a little village in a valley, with its typical bamboo and palm groves and rice paddies. Forest undisturbed, though a few trees had been cut.
NOTE: Some specimen labels bear the locality "2 MI. N. TYAGLI"; though this is the precise locality, the biotypes are identical. TYAGLI alone will suffice.

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STOP 175 - MYSORE: JOG FALLS, 525 METERS, II-17-62
1500 specimens.
Rain forest area near the western escarpment of the western hill range. Diurnal collecting; dense jungle in a small creek gully not

far from the falls itself (perhaps a mile or 2). Tall evergreen trees; understory of leafy bushes and young trees and an occasional pandanus. Ground moist, especially in the bottom of the gully near the stream. Leaf mould yielded good Collembola and some beetles; sweeping the jungle undergrowth near the creek was also productive. Entire area — filtered sunlight. Temperature — 86°-90° F.

Nocturnal collecting: In the compound of the rest house on the north side of the river, situated at the brink of the cliff overlooking the falls and the immense canyon below. The rest house is located in a relatively undisturbed spot, backed on the one side by natural forest (mixed evergreen-deciduous, tending more to the former), on the other by the cliffside flora — grasses, smaller trees, and shrubs.

The evening temperature was 75° F, but a bright moonlight apparently was the cause for slow collecting, as well as the dry season, of course.

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STOP 176 - MYSORE: SAGAR, 600 METERS, II-18-62.
150 specimens.

Dry mixed forest, largely deciduous with some evergreen species, bordered by cleared grassy fields. Gently rolling plain marked by low hills. Collecting stop located a few miles west of town.

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STOP 177 - MYSORE: 16 MI. N.W. SHIMOGA, 650 METERS, II-18-62
100 specimens -

Extremely dry thorn forest, primarily deciduous, with characteristic clumps of bamboo 20-50 feet high. Most of the bamboo, however, was either

dead or dying. Low hill area — conditions extremely dry.
A check locality which pin points the area is KUMSI, a small town which does not appear on most maps.

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STOP 178 — SHIMOGA, MYSORE, 1898 feet, II-18-62
1000 specimens.

A one-night camp located in the grounds of the circuit house, 1 mile N.W. of town. Dry grassy fields, heavily grazed by cattle and goats; scattered low bushes. The countryside might be called gently rolling, and is marked by low hills around the more flat valley in which Shimoga is built. The circuit house is located on a gentle rise overlooking a small lake less than a quarter mile away and a little stream running closer to camp. Trees scarce.

The evening started off quite well; small aquatics, etc., swarmed in to the black light from dusk until about 8 o'clock. A sudden stiff breeze blew up and collecting dropped off. 75°F

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STOP 179 — MYSORE: 10 MI. S.W. SHIMOGA, 600 METERS, II-19-62
1000 specimens.

The road to Tirthahalli parallels the TUNGA RIVER, occasionally cutting along the lower slopes of the forested hills bordering the river valley. The forest type of the area could be termed deciduous thorn perhaps, consisting of medium-sized trees with an understory of tangled thorny bushes. The forest was quite dry in February. These specimens were collected primarily by sweeping grass and herbs along the shoreline of a man-made lake behind a dam on the Tunga. The shore vegetation

had recently developed because of the damp conditions there; Remains of the old bamboo clumps characteristic of this type of forest along western India, stood along the waters edge, killed by submersion. Farther up the gently-sloping shore green clumps of bamboo thrived on the close proximity of water. Some specimens were collected under bark flakes in the dry forest itself.

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STOP 180 - MYSORE: 8 MI. N.E.
TIRTHAHALLI, 675 METERS, II-19-62
100 specimens

Dense evergreen forest with thick undergrowth. Thick litter of leaves and dead branches on the dry ground. Warm, sunny day. Red soil, rocks scarce. Hilly area.

STOP 181 - MYSORE: 12 MI. N.
BALEHONNUR, 760 METERS,
II-19-62 250 specimens

Camp situated on a small ridge in an undisturbed, mixed evergreen-deciduous forest. The trees on the ridge tended to be deciduous species while those on the gentle slopes were primarily evergreen. With the exception of dry grassy spots in the more open forest on the ridge, a thick tangle of undergrowth persisted beneath the trees. A heavy dew condensed on the grass early in the night. A full moon no doubt reduced the black light take.

Specimens were also collected under rotting logs and occasional stones. The ground was quite dry.

Hilly countryside.

A pin point locality would be CHIKAGRRHAR village a mile or so from camp.

NOTE - specimen labels bear direction S.W. - S. is correct.

STOP 182 - MYSORE: 15 MI. S.
CHIKMAGALUR, II-20-62.
900 METERS
100 specimens.

A typical coffee plantation ~~in~~ along a winding ghat road. Large shade trees, remains of the natural forest cover, had produced a thick layer of leaves on the somewhat damp ground beneath the coffee bushes. Specimens collected under bark flakes, etc. Steep slopes.

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STOP 183 - MYSORE: 10 MI. N. BELUR,
1025 METERS, II-20-62
1500 specimens.

The gently rolling Mysore plateau breaks up into a series of dissected, heavily forested hills both north and west of this locality. From the edge of the escarpment westward the streams contribute to the western drainage system. Belur, situated on the plateau itself, seems to be in the eastward drainage system. The countryside consists of barren rolling hills and valleys, dry grassy fields (green come the rains of course), scattered plowed fields, and very few trees. These specimens were collected in the grassy fields adjacent to a long rocky ridge forming a low hill. Many insects were collected by sweeping the heavily grazed grass along the damp shore of a small pond. Hot sunny day - gentle breeze.

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STOP 184 - MYSORE: 7 MI. S.E.
SAKLESHPUR, II-21-62,
900 METERS
100 specimens.

Coffee-banana plantation in steep ghat country. Large shade trees were the only remnants of the original thick forest cover. Ground and leaf litter were

slightly
damp from a light rain the night before. Bark flakes remained quite dry.
Warm sunny morning

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STOP 185 – MYSORE: 15 MI. N.E. SOMWARPET, 960 METERS, II-21-62
250 specimens.

Mixed forest, many species, primarily evergreen, medium-sized trees. Dense forest bordered by grassy slopes. Low hills undisturbed by agriculture. The ground was moist from a light rain the previous evening. Specimens collected under stones at the edge of the forest. Some collected by net as well.

SOMVARPET on some maps

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STOP 186 – MYSORE: 8 MI. N.E. MERCARA, II-22-62, 1000 METERS
200 specimens.

Hill country covered with dense evergreen forest. Rice agriculture carried on in the narrow stream valleys ~~in~~, the manner characteristic of the western hills. In some places the forest has been thinned for coffee growing. These specimens were collected in the deep shade of a fairly undisturbed patch of forest having an understory of gingers, ~~and~~ small bushes, and young trees. Many fallen trees, branches, and a thick layer of leaves littered the ground, still moist from a morning rain. In fact during the afternoon a light rain fell throughout the area and the sky remained cloudy during this stop. Collecting under rotting logs in the forest shade, on a fairly steep slope, produced most of these specimens.

STOP 187 - MYSORE: 5 MI. S.E.
MERCARA, 1050 METERS, II - 22 - 62
150 specimens.

Typical Coffee plantation that country, moist from recent rains. Specimens collected in a piece of forest, thinner and more open than that at stop 186, on a steep-sloped hill near some banana and coffee plots. Some grassy fields among the trees.

Evergreen trees primarily

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STOP 188 - MYSORE: 4 MI. S.W. SIDAPUR,
II - 22 - 62 900 METERS
500 specimens.

Mixed evergreen - deciduous forest, tending more to the evergreen species, in rolling hill country. Specimens collected in a patch of undisturbed forest, along the roadside; ground moist from recent rains. Bark collecting in felled trees proved productive. Partially cloudy day

AMMATHI village pinpoints the locality.

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STOP 189 - MYSORE: 7 MI. S.W.
VIRAJPET, 650 METERS, II - 22 - 62
2000 specimens.

Camp situated by the WATEKOLLY forest rest house, in a grassy clearing at the edge of a slope densely covered with rain forest. A trail covered with grass in the open spots, with a thick layer of leaves beneath the trees, leads from the rest house down the hill to a rocky stream. Specimens were collected along the trail and the stream itself. Black light collecting was good in spite of full moonlight. 75°F early in the evening, dropping to 70°F by 9:30 P.M., when collecting gradually tapered off. (NOTE: The Indian Automobile Association map and the Tourist map of India series both spell the town fully as VIRARAJENDRAPET. All road signs and boards in the town spell the

same as given on the label.)

KERALA (one stop)

STOP 190- KERALA: 18 MI. N.E.
MATTANUR, 75 METERS, II-23-62
75 specimens

Open evergreen forest on steep slope; understory of bamboo, 2-8 ft tall, and low bushes. Red earth covered by a thick carpet of leaves. Ground moist from recent rains MAKUT forest rest house near by.

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STOP 191- MYSORE: 12 MI. E.
VIRAJPET, 850 METERS, II-24-62
500 specimens

Mixed evergreen-deciduous forest in rolling countryside. In addition to a large variety of tree species large clumps of bamboo, some 50 feet or more high, grow in this zone. The forest must have originally been rather open in habit but recent cutting operations rendered it even more open and free of thorny undergrowth. Conditions of soil — extremely dry but not too solidly packed. The ground was well worked over by termites, typical of course nearly everywhere in India. The only moisture in the forest could be found in the dung and bark nitches, though even most of the bark on dead, fallen trees had dried considerably. Nevertheless collecting was productive on certain large trees.

Conikopal, a town of moderate size located 2 miles west of this stop, pinpoints the locality. Warm, partially cloudy morning

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STOP 192- MYSORE: 5 MI. W. HUNSUR,
850 METERS, II-24-62
100 specimens.

Gently rolling countryside sparsely covered with thorny bushes 2-10 feet high. Specimens collected on and adjacent to a little group of rocky

hills. Ground quite dry, red and sandy at the foot of the hills, nearly black and hard on the slopes. Warm, partially cloudy afternoon.

---

STOP 193 – MYSORE: 8 MI. S.W. MANDYA, II-25-62 700 METERS
200 specimens

Barren granite hill with scattered rocks and clumps of grass on sandy soil between smooth exfoliation surfaces of granite. Soil moist from recent rains.

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STOP 194 – MYSORE: 6 MI. N.E. RAMANAGARAM, 750 METERS, II-25-62
150 specimens.

Small granite hill between plowed fields in gently rolling countryside. Soil between granite rocks covered with deep grass and scattered trees 10-30 ft. high. Ground moist from recent rains; in fact, rain began to fall during the stop.

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STOP 195 – MYSORE: 5 MI. S.W. BANGALORE, 800 METERS, II-25-62

Barren, gently rolling countryside, covered thinly with grass and an occasional little bush — no trees. Hard ground, fairly dry, with many scattered rocks. Partially cloudy afternoon, 80° F.

200 specimens

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STOP 196 – MYSORE: KOLAR, 820 METERS, II-26-62
100 specimens

Steep granite hills just west of town. Conditions on the rocky slopes very dry, though a

small pond lingered at the foot of the hill. Grasshoppers were collected in heavily grazed, nearly dry grass in the proximity of the little pond.

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ANDHRA PRADESH

STOP 197 - A.P.: 6 MI. W. PALMANER, 125 METERS, II - 26 - 62
250 specimens.
Granite hills covered with evergreen thorn scrub 5 - 10 ft. high. Ground, sandy decomposed granite chiefly, dry, supporting only a ~~scattr~~ small amount of grass. Many loose stones scattered about. Hot sunny afternoon, 90° F, becoming suddenly partially cloudy, somewhat cooler, with a light shower.

MADRAS STATE

STOP 198 - MADRAS: VELLORE, 200 METERS, II - 27 - 62
200 specimens.

Vellore lies in a small dry valley among old heavily eroded granite hills typical of the region. These specimens were collected in and around the Christian Medical College compound, on the outskirts of town near a large collection of granite boulders known as College Hill, bare of vegetation with the exception of a sparse cover of grass here and there. The compound has of course been disturbed by building and planting; many large trees, mangos and others, grow about near planted gardens. Large, dry, grassy fields, heavily grazed, provided some grasshoppers collecting. Some insects were also collected in an irrigated rice paddy area adjacent to the

campus. Weather clear, sunny, and hot (90°F), humidity quite low. Night breezy and cooler, reducing night collecting to almost nothing.

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STOP 199 - MADRAS: 10 MI. S.W. GUDIYATTAM, 350 METERS, III.-4-62

100 specimens.

Dry, fairly flat valley near low, scrub-covered granite boulder hills. Specimens collected in dry fields, under stones and bark flakes, near scattered large trees (primarily the species from which tamerind is obtained). Warm morning (85°F). Near Pernambut (Grumman's Compound)

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STOP 200 - MADRAS: TOPPUR, 350 meters, III-5-62

50 specimens

Dry, scrub-brush, rather steep slopes, ghat road. Some scattered large trees. Conditions quite hot and dry.

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STOP 201 - MADRAS: YERCAUD, ~~1300 METERS~~, III-6-62

2000 specimens. 4000 feet

Camp was located on a knoll in the vicinity of the Highway Department inspection bungalow, surrounded by many trees, tangled thickets (especially lantana), and open, grassy slopes. The forest in the rolling countryside around ajercaud, similar to that of Mahableshwar (STOP 168), consists of a variety of evergreen and deciduous trees but tends more to the evergreen type. A dense understory of brush covers the ground surface on the slopes but thins somewhat in shady exposures and creek gullies where the forest is taller.

Many of the hill slopes have been planted with coffee and silk oak shade trees.

From Yercaud a drive of some 18 or 19 miles can be taken along a loop road which returns eventually to the junction of its origin. Specimens were collected periodically along the easternmost half of the loop as far as Canvery Peak, about 9 miles from Yercaud. A forest rest house and the Canvery Peak Coffee Estate are located at that extremity. Insects were taken in a variety of niches — under logs in forest shade, where the soil was moist and the leaf litter thick; under stones on hot, sunny, dry slopes recently deforested; sweeping along marshy areas near streams and forest undergrowth in shaded areas, etc. All specimens were collected at roughly the same altitude; the Canvery Peak biotype is essentially the same as that of the Yercaud vicinity itself. Diurnal temperature fell around 80°F while the night temperature dropped to a "Cool" range.

Yercaud is situated in the ~~SHEVROY~~ HILLS

SHEVAROY

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STOP 202 - MADRAS: 7 MI. S.W. AVANASHI, III-7-62 ~~200~~ METERS ~~400~~ 390

750 ~~200~~ specimens.

A quick afternoon roadside stop about 18 MI. N.E. of Coimbatore. Specimens taken under stones heaped and scattered along the living fences of euphorbia and thorn-bush dividing the field plots. Rather flat, barren plain. Condition superficially very hot and dry, though a few inches down, in the shade especially, the ground was slightly moist from a recent shower. 90°F.

STOP 203 - MADRAS: 16 MI. N.W.
COIMBATORE, 640 METERS,
III - 8-62

Open rolling hill country - side covered with high evergreen tangled brush. Many small creeks running through ~~a~~ occasional clearings in which watermelons are grown. Sweeping grass and moist ground near creeks was productive. In fact most specimens were collected along such wet spots where they gathered to drink water. Clear, sunny day - 90°F.

This collecting spot ~~was~~ is located about 2 miles from the Kerala border, along the upper end of a dead end road running through the little valley of the Sangamurpallam, a small stream running from the divide near this hilly collecting spot down the valley and onto the plain of Coimbatore. Though springs still flowed in the divide the main valley segment of the Sangamurpallam was dry. Mangarai and Samayyanur are two small villages in the valley itself. The collecting area is surrounded by the Anaikatty reserve forest (the scrubby evergreen-deciduous forest and brush of the slopes); Tadagam R.F. lies to the north, Boluvampatti R.F. ~~to~~ the south.

1000 specimens

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STOP 204 - MADRAS: 5 MI. N.W
COIMBATORE, 510 METERS,
III - 8-62

150 specimens.

Dry, barren rocky hillside bordering the valley mentioned under STOP 203. Sparse grass cover, thicker along the roadside than on the slope itself. No trees or shade whatsoever. Hot, windy afternoon, 90°-95° F. Grasshoppers were quite abundant on the hot slope and roadside.

STOP 205 - MADRAS: COIMBATORE, 430 METERS, III-8-62

1000 specimens.

Coimbatore is situated in a broad, flat valley irregularly surrounded by granite hills. The rainfall in the valley is somewhat higher than neighboring flatlands because the Palghat gap lets through a larger amount of monsoon rain. The town and suburbs cover much of the valley, and what is left is cultivated under crops of various sorts.

These specimens were collected on the campus of the Government Agricultural College at the outskirts of town. Open planted fields of Cotton and other crops produced most of the diurnal material. The fields were extremely dry (no irrigation); collecting was especially good at blossoming bush morning glories growing along the paths between the fields.

Fields of dry grass and stubble were especially good for grasshoppers.

The black light was located in the garden of one of the "imperial bungalows", a few hundred yards distance from the agricultural fields. Planted shrubs and many large trees grew about the area. Night warm; slight breeze early in the evening, subsiding later. Evening temperature, 80°F, cooling gradually; diurnal range, 90°-95°F.

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## NILGIRIS, SOUTH INDIA

STOP 206 - NILGIRIS: BURLIAR, 650 METERS, III-10-62

50 specimens.

Dense evergreen heavy-rainfall jungle on the Ootacamund ghat road. Conditions quite moist.

Warm, sunny morning.

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STOP 207 – NILGIRIS: OOTACAMUND, 2330 METERS, III-10-62

1500 specimens.

The "Ooty" countryside is a sad commentary on civilization; where the unique flora of this life zone once covered the rolling hills, today as far as one can see in every direction there are only tea plantations, blue gum plantations, cut over slopes covered with introduced scotch broom, agricultural terraces, and the planted gardens of the town. Nevertheless there are a handful of tiny patches of native vegetation scattered here and there, hidden between the encroaching eucalyptus groves. The largest remnant may be found on Dodabetta Peak (STOP 208); some scattered groups of trees also remain in the protected gullies and canyons between the downs on the Mysore road. One tiny unit of the native flora still survives close to town, a short walk through blue gum plantation from the forest bungalow. The forest consists of small, round-top trees 20-40 feet high, draped with vines, moss, and epiphytes. Low growing herbs and ferns comprises the only undergrowth, leaving the forest rather open in the filtered shade. Here and there the tree-sized Rhododendron nilgiriensis grows among the other species.

Sweeping was productive in a little vale at the foot of the forest. A weeping willow plot was started several years back in the boggy valley; heavily grazed but green grass covers the whole valley floor.

Partially cloudy day – 65° F.

STOP 208 - NILGIRIS: N.E. SLOPE, DODABETTA PEAK, 2475 METERS
III-11-62
1500 specimens.

Dodabetta, the summit of which is 8636 feet above sea level, is the highest peak in Madras State. Though most of the mountain — including the summit itself — has been stripped of the unique native flora to make way for blue gum plantations and the encroachment of scotch broom, one slope has escaped destruction. Here a large variety of species thrive in the moist condition, averaging 20-30 ft. in height. Unfortunately scotch broom has gotten in to a few clearings, but the forest is generally undisturbed.

Sweeping the low herb understory was productive for Diptera especially. Many specimens were collected in a ~~[illegible]~~ stump 6 feet high, perhaps 3 feet in diameter, rotten throughout. The wood was quite moist and soft and could easily be ripped apart by hand.

Partially cloudy afternoon, 60°-65°F.

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STOP 209 - NILGIRIS: 7 MI. N.W. PYKARA, 6500 FEET, III-12-62
1000 specimens.

These specimens were collected in a patch of native forest nestled in a canyon at the edge of the ghats. Though the rolling downs at this point have become steeper and the canyons larger because of the close proximity to the steep ghat face, the forest is more like the Ootacamund type rather than that of the N.W. slopes at a lower altitude (STOP 210). Condition moist, trees covered with moss and epiphytes. Most specimens were collected by sweeping the low herb understory in filtered shade in a stream canyon.

Sunny morning.

Pykara is a small town which appears on most maps. There is a large dam there retaining a water suply lake.

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Note one lot of butterflies collected 1 mile S.E PYKARA in a grassy meadow surrounded by native forest, labeled NILGIRIS: PYKARA, 2180 meters III-12-62

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STOP 210 - NILGIRIS: 5 MI. S.E. GUDALUR, 5000 FEET, III-12-62
150 specimens
Native forest, steep N.W. slopes of the Nilgiris, Ooty-Mysore road. Mixed evergreen-deciduous forest type, thick, thorny undergrowth. Extensive lantana encroachment. Conditions very dry. Warm, sunny morning.
Specimens collected under stones, etc.; some net collecting.

MADRAS STATE

STOP 211 - MADRAS: MUDUMALAI, 950 METERS, III-12-62
700 specimens.
These specimens were collected not far from the rest house in the Mudumalai Wildlife Sanctuary. Relatively undisturbed forest, primarily tall deciduous trees and giant bamboo. Extensive lantana encroachment. Sweeping grass along a stream was productive. Condition of the forest — extremely dry.

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MYSORE

STOP 212 - MYSORE: BANDIPUR, 950 METERS, III-13-62
150 specimens.

Specimens collected within a 3-mile radius of the rest house-forest range office area, headquarters in the Bandipur Wildlife sanctuary. Dry deciduous forest, some thorn

undergrowth and lantana encroachment. Forest nevertheless rather open. Some specimens collected under stones, ground dry. Warm, sunny weather. A strong breeze severely cut the night collecting.

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STOP 213 - MYSORE: 5 MI. S.W. CHAMRAJNAGAR, 800 METERS, III - 13-62
50 specimens.

Open, barren, rolling countryside, very few trees. Occasional low thorn bushes between scattered rocks. Sparse grass cover. Ground hot and dry. Windy, hot afternoon.

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STOP 214 - MYSORE: 2 MI. N.W. PUNJUR, 850 METERS, III - 13-62
300 specimens.

Open, gently rolling countryside, partially cleared for fields and grazing. These specimens were collected under stones and dung along roads walls between fields, and beneath a few large deciduous trees growing here and there. Ground nearly bare, very dry. Warm, windy afternoon. Though no undisturbed forest grows near this ~~area~~ place, the forest type of the area, seen in excellent stands to the S.E. of Punjur, is mixed deciduous, many species, with some evergreen species and much giant bamboo and tangled thorn undergrowth in places.

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MADRAS STATE

NOTE: "MADRAS" on specimen labels could be confused with the city of Madras. Therefore "Madras" should be changed to "SOUTH INDIA" on all stops in Madras State. A separate label, [S. INDIA], might be desirable for these.

SOUTH INDIA

STOP 215 - S. INDIA: SETHUMADAI,
NR. POLLACHI, 375 METERS,
III - 18 - 62 300 specimens.

Sethumadai is a small village 16 to 19 miles road distance S.W. Pollachi, depending on the route taken. Situated in ~~the~~ gently undulating valley land, largely disturbed by village and field, Sethumadai is not biologically as interesting as the Anamalai Hills which border the valley less than 2 miles on the S. and W. of Sethumadai. These specimens were collected under stones among scattered trees in a grazed grassy field adjacent to a rest house at the edge of the village. Ground extremely dry.

STOP 216 - S. INDIA: TOPSLIP,
ANAMALAI HILLS, 760 METERS,
III - 18 - 62 700 specimens.

Topslip, a small town in very hilly countryside at the ~~top~~ of a step ghat section, is surrounded by some plantations of teak and other commercial trees and large stands of relatively undisturbed forest. Slope exposure apparently is ~~very~~ quite important in determining floral type; some slopes, probably receiving less rainfall, are covered with a thick deciduous forest mixed with large bamboo while other sections are clothed in evergreen forest characterized by tall old trees, large vines, and fairly dense evergreen undergrowth. Due to the large number of plant species in ~~the~~ two forest types, Topslip would be an excellent collecting spot at the time of the first rains and during the rest of the monsoon months.

These specimens were collected in an evergreen forest on the ridge opposite the rest house. The undergrowth has been cleared in part of the forest and the trees named as in a botanical garden, but deeper in the forest is less disturbed. A good collecting trail winds through the native flora.

Dung beetles were collected on the grassy, open slope adjacent to the rest house. Clear, sunny weather, cooling off in the evening.

- ANAMALAI is also spelled ANAIMALAI

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STOP 217 - S. INDIA: 3 MI. N.E. TOPSLIP, ANAMALAI HILLS, III-19-62
560 meters 400 specimens.

Located near the base of the ghat road to topslip, this stop ~~consisted of~~ constituted about an hour of morning collecting on a warm, sunny day. A small ~~stream~~ creek runs out of a steep-slope gully into an open clearing, somewhat encroached upon by lantana in the usual fashion. The surrounding forest upstream is native deciduous, with some thorny undergrowth. Much of the topslip ghat still retains its native flora, though patches have periodically been cleared for plantation. A teak-sisham plantation had recently been put in near this stop, for example. While this ghat can currently be recommended as a good collecting spot during the right season, it may in the future be destroyed (biologically) by these plantation encroachments.

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STOP 218 - S. INDIA: 10 MI. S. UDAMALPET, 450 METERS, III-19-62
150 specimens.

The country between Udamalpet and Munnar deserves special mention. Some distance south of Udamalpet a ghat section begins and extends 48 miles to Munnar, continuing down the western face of the hills from

there. The rain shadow effect is striking; while the western slopes support dense rainforests, the eastern slopes, especially at the lower elevations, are covered with deciduous and mixed semi-deciduous forest. This stop, for example, located at the base of the ghat in rolling country bordered on both sides by hills, was characterized by deciduous forest, thorn-bush undergrowth, and large euphorbias. The high country (5000 - 6000 ft.) has been extensively planted in tea and some forest crops, especially eucalyptus; in fact some of the largest tea estates in India are located in the Munnar valley. Some patches of the high elevation flora remain, however, especially above the 6000 ft. level (STOP 219)

Because of the large variety of plant species growing especially in the deciduous and mixed forest zones on the E. and N.E. slopes, and the

STOP 218 was located not far (about 1 mile) north of CHINNAR, the KERALA border.

relatively undisturbed conditions there, the Travancore Hills can be recommended as one of the best collecting areas in South India. Though the dry conditions of the low E. slopes and the coolness of the highest elevations mark the off season from December to perhaps April or May, the advent of the monsoon rains in June mark the beginning of excellent insect collecting. The rain forest on the west side would be especially productive during the rains also, but fragmentary rains nearly the year round causes a rich insect fauna most of the time.

The Stop 218 specimens were collected under stones primarily, near the road at the foot of rocky slopes covered with euphorbias and thorn bush among deciduous trees. Ground dry and sandy.

STOP 219 – S. INDIA: 8 MI. N.E.
MUNNAR, 6200 FEET, III-20-62
1500 specimens

NOTE – Since Kerala frame with Madras State the southern tip of India, Kerala state could also be included in the [S. INDIA] label.

While some native forest has survived the tea planting along the banks of streams and in canyons too rocky and rugged for tea picking, the largest stands of the unique high-elevation flora of the Travancore Hills* can be found along the high ridges above the slopes of tea and eucalyptus. These specimens were collected in one of these sections of forest on the steep slopes of the divide between the Eastern (actually more northern at this point) drainage and the Munnar drainage on the southwest. Here the road reaches the highest elevation.

* more specifically known as the KANNAN DEVAN hills.

The forest, similar to that of Ootacamund (stop 207) ~~but~~ in appearance but different of course in speciation, especially lacking the tree rhododendrons and other plants characteristic of the higher elevations not found in the Travancore Hills, consists of a variety of species of evergreen trees (with small leaves primarily). Many epiphytes grow on the branches because of heavy rainfall. Large numbers of tree ferns grow here and there among the other trees but concentrate along streams and canyons. An impenetrable understory of plants restricted collecting to cleared boundary line trails and roadsides. The moist ground ~~was~~ is covered with leaves and rotting logs. Sweeping the herbage along creeks and trails proved productive, and the rotting logs yielded Passalids, cockroaches, and many other specimens.

The general Munnar area is known as the High Ranges.

STOP 220 – S. INDIA: 7 MI. W.
MUNNAR, 1100 METERS, III-21-62
1000 specimens

From Munnar the Cochin road continues to descend through steep, hilly countryside. Most of the area is planted in tea; in fact, 5 miles W. of Munnar is PALLIVASAL, another large tea factory center with village. 2 miles farther down the hill there is a section of slope under a spice in the ginger family – perhaps turmeric – grown as an understory in a thinned native forest. Here the trees are tall and straight, much larger than those higher up on the ridges (stop 219). The undergrowth has been cleared to make way for the spice; beneath these 5-ft. plants many herbs and ferns survive, especially along the banks of steep, rocky creeks. Sweeping this understory was productive for Diptera especially.

Conditions were quite moist from recent rains.
– Politically in Kerala state

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STOP 221 – S. INDIA: 12 MI. W.
MUNNAR, 840 METERS, III-21-62
1000 specimens

4 MI. E. KOOMPANPARA, a small hillside village, pinpoints the locality more closely. Thinned native forest on hill slopes, much like STOP 220 – planted with an understory of spice, probably turmeric. Conditions in this forest were somewhat drier than in the stop 220 forest. A small pond of water had collected in a flat area at the head of some small fields. Sweeping the herbage and leaf litter around the edge of the pond, the only moist spot on the slope, proved productive.

ADIMALI is located 6 miles farther down the slope.

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The best forest on this Munnar-Alwaye – Cochin road is an undisturbed rain forest along

the Periyar river, N.E. of the bridge across the Periyar, where the road descends a steep ghat onto the Cocoanut palm coastal plain.

all in Kerala state

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STOP 222 - S. INDIA: KANJIRAPALLY, 175 METERS, III-21-62
150 specimens.

Located about 20 miles east of KOTTAYAM, the Kanjirapally rest house is surrounded by the typical Kerala Coastal plain flora, entirely cultivated, consisting of cocoanut, betel nut, and other palms, rubber plantations, banana and mango groves, cashew nuts, and so forth. In addition to many puddles and tanks of water in the area, recent rains, including a heavy shower earlier the same day, moistened the countryside thoroughly. These specimens were collected at the black light in the rest house compound. Warm evening, about 80°F.

Kanjirapally is somewhat higher than Kottayam, being situated closer to the ghat to Periyar Lake. At this point the terrain becomes slightly hilly.

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STOP 223 - S. INDIA: KITTIKANAM, NR. PEERMADE, 1000 METERS, III-22-62
700 specimens.

The ghat from Kottayam (beginning near Kanjirapally) to Kumily and Thekkadi, while scenic, has been nearly ruined biologically to make way for eucalyptus plantations, ~~[illegible]~~ tea, bananas, and other crops. Some native vegetation, especially larger trees, remain on the steep section of the ghat, but by far the best remains can be found at Kittikanam, near the top of the ghat, where the Maharaja of Travancore has set aside patches of native forest in the vicinity of one "palace" and some of his tea acreage. The gently rolling slopes and small

creeks, quite moist from rains the night before, were covered with evergreen forest ~~with~~ and fairly dense undergrowth. The trees in this zone are not of large stature, ranging from 15 to 25 or 30 ft. in height.

Collecting was especially good ~~at the~~ where the forest edge bordered clearings planted in tea or trails and roads leading to buildings here and there on the grounds. Sweeping wet fallen leaves and herbage along the creeks in filtered forest shade proved productive for ~~some~~ flies especially.

Peermode is spelled PIRMED on some maps, but the former spelling seems to be the one locally in vogue.

Kittikanam is located in the Peermade Hills.

STOP 224 – S. INDIA: PERIYAR LAKE, 900 METERS, III-23-62
1500 specimens.

Situated in rolling hills where the southern end of the Cardamom range meets the S.W. end of the Varushanad – Andipatti Hill axis, Periyar is an old man-made lake (1895) surrounded by native forest, now a large game sanctuary for wild elephant, sambar, bison, etc. The forest type is determined by slope exposure and therefore rainfall; while the eastern exposures display open deciduous forests of teak and other species, with an understory of elephant grass and the inevitable lantana, the slopes catching the rain from the west are clothed in dense evergreen rainforest – many species of immense trees and vines, with an understory of low herbs and small seedlings. The contact between the two biotypes is often very marked.

Collecting was definitely better in the evergreen forest. The deciduous forest areas are burned over each year so that the new grass can grow as a clean slope, with the result that these sections are rather sterile during the cool season when the trees are bare.

Though March is the beginning of the so-called "summer season" in the hills, the weather was cloudy during most of the collecting day, though ~~the~~ quite warm and humid. A heavy rain had soaked the forests the afternoon before.

These specimens were collected at the north end of the lake, at or within hiking distance of the P.W.D. bungalow, Thekkady. Sweeping the grassy shores of the lake, at fairly low water during March, yielded a variety of flies, etc; sweeping the herbage in the filtered shade of the jungle was also productive.

Aerial collecting was especially good along the edge of the evergreen forest, near the lake shore or along creek and meadow clearings. Many specimens, especially Coleoptera, were taken at rest on the leaves of the forest understory.

Periyar sanctuary affords the best opportunity to sample relatively undisturbed native flora typical of the area; the forest has been largely destroyed elsewhere. The ghat or grade just beyond Kumily, ~~on the~~ northeast of Periyar, is a fair deciduous forest collecting area also.

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STOP 225 - S. INDIA: 5 MI. E. THENI, 350 METERS, III-24-62

100 specimens.

Rather flat countryside at the end of the Andipatti hill axis, marked by heavily eroded, fairly barren granite hills. Sandy granite soil moist from recent rains. Specimens taken under stones,

dung, etc., at the foot of one hill. No trees. Flat, sunny day - 90°F.

Theni - Usilampatti - Madurai road. Theni is spelled Teni on some maps.

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STOP 226 - S. INDIA: 2 MI. E. ANDIPATTI, 350 METERS, III-24-62

Andipatti is situated about half way between Theni and Usilampatti. East of Andipatti the road passed over a low divide between barren granite hills. This stop, locality at the base of the first hill is unmistakeable because of a number of flat-topped acacia planifrons trees growing there; these typical S. Indian trees are visible from a considerable distance. About 50 specimens were collected under stones beneath the acacias. A few grasshoppers, etc., were about on the nearly bare sandy ground, but the temperature was so extreme in the open fields during the afternoon that insect activity was reduced to a minimum. 95°F (shade).

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STOP 227 - S. INDIA: 5 MI. N.E. SRIVILLIPUTTUR, 200 meters, III-24-62 100 specimens.

Flat, dry plain, not far from the base of the Eastern Ghats, largely disturbed by agriculture. Specimens were collected under stones in the shade of a roadside tamarind grove. Ground moist from a recent rain.

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STOP 228 - S. INDIA: 10 MI. N.W. MANUR, 120 METERS, III-25-62 150 specimens.

Fairly flat, dry plain largely disturbed by agriculture. These specimens were collected under stones in the vicinity of a roadside religious shrine surrounded by a few large trees. Soil moist from a

recent rain.

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STOP 229 - S. INDIA: 5 MI. S.W. NANGUNERI, 125 METERS, III - 25 - 62 100 specimens.

These specimens were collected in and around a mango grove on the north side of the NAMBIAR River. Hot, sunny afternoon. Surrounding countryside — rather flat plain washed by a few scattered hills; desert-like wasteland with some attempts at agriculture.

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STOP 230 - S. INDIA: NAGERCOIL, 50 FEET, III - 26 - 62
600 specimens

The large compound of the Lutheran Mission, located in the southside outskirts of town, provided a fair collecting spot. Though the garden environment was entirely man made, fields of dry grass approached once again a natural condition. Large blossoming Peltophorum trees provided food carpenter bee collecting while other flowers attracted some butterflies.

Hot, sunny day, warm evening.

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STOP 231 - S. INDIA: DOHNAVUR, TIRUNELVELI DIST., 50 METERS, III - 27 - 62
200 specimens.

Dohnavur is nothing more than a village located on the coastal plain not far from the base of the Ashambu Hills. Because of the rain shadow effect the eastern coastal plain of S. India is quite dry, approaching semi-desert in places. Some farm land is irrigated, however.

The most notable landmark at Dohnavur is Dohnavur Fellowship, a mission orphanage of considerable size. These specimens were collected

on the extensive grounds of the orphanage, heavily planted in shrubs and many large trees. With the exception of a few watered plots, the area was quite dry. Aquatic insects which came to the light must have come in from nearby small storage ponds and open wells.

TIRUNELVELI, not far to the northeast, is spelled TINNEVELLY on some maps, but the current spelling seems to be the former, being found on recent maps and on all signboards in town.

Dohravur Fellowship maintains some cottages 9 miles distance on the heavily forested slopes of the hills, reached partly by motor, the rest by hiking. The deciduous forest consists of a large variety of species. Collecting there about the time of the first rains would be excellent.

STOP 232 - S. INDIA: 3 MI. S. KUNIYUR, TIRUNELVELI DIST., 50 METERS, III-28-62
50 specimens.

Dry, barren granite hill, some grass and thorny shrubs. Specimens collected primarily under stones.

Stop located 10 miles N. of Kalakad also.

* 3 mi. SE. TENKASI 140 m 28.III.1962 SWARMING ON FICUS TREE WASPS (THERE WERE NESTING INTREE HOLE 300 spec.

PALNI HILLS, S. INDIA

STOP 233 - PALNI HILLS, S. INDIA: KODAIKANAL GRADE, 750 METERS, III-29-62
200 specimens.

There is one customary way of approaching Kodaikanal; the main road leaves from the NILAKKOTTAI - PERIYAKULAM road and ascends a long ghat section on the Madurai side of the Palnis. Kodai

can also be approached from the west by way of a small mountain road from Munnar which traverses hill country along its entire length (see stop 237). The Madurai approach from the eastern plains is the one which can unmistakeably be termed Kodaikanal grade.

This stop, 22 road miles down-grade from Kodai, 5 miles down-grade from Oothu to be more precise, consisted of sweeping the grass and herbs along a small creek issuing from forested slopes into a clearing near the road. The forest in this zone is composed of a variety of large-leaved evergreen trees of tall stature. Due to periodic rainfall ~~and~~ ~~grass~~ creek moisture the grass was quite green.

STOP 234 - PALNI HILLS, S. INDIA: KODAIKANAL GRADE, 1150 METERS, III-29-62 100 specimens.

4 miles down-grade from a little post called PARVAT VIHAR pinpoints this locality. Specimens were collected on a sunny day in a patch of native forest near the road. The trees, evergreen, have smaller leaves than those at lower altitudes; the height of the trees decreases with ~~an~~ increases in altitude also. Many vines festoon the trees in this grove. The forest floor, thickly covered with rotting leaves, is relatively free of understory, with the result that getting about is quite easy. Branches and trunk bark bear a thin coat of moss, but epiphyte development is not extensive. Forest condition - rather dry. Ground beneath leaves - slightly damp.

STOP 235 - PALNI HILLS, S. INDIA:
KODAIKANAL GRADE, 1600
METERS, III-30-62
1000 specimens

Tiger Shola, one of many such patches of forest surrounded by grass-covered hills in the Palni Range, will safely remain an excellent natural collecting area because it has been set aside as a reserve forest. Closely resembling the forests of the Nilgiris and Kavan Devan Hills, Tiger shola consists of a large variety of small, ~~small-leafed~~ evergreen trees with rounded crowns and small leaves. ~~Along~~ The forest edges, ~~bordering the~~ road and stream, are thickly tangled with vines and undergrowth due to the exposure to full light. Moving about is quite easy within the forest, however; the understory is limited.

Tiger shola completely covers ~~the southern slope (facing north~~ one slope of the steep-sided canyon just below Kodaikanal. Sweeping the herbage along the stream at the bottom of the canyon, in the filtered shade of the forest, proved productive. The forest floor was quite damp from a fairly recent rain. ~~Sunny afternoon.~~ Partially cloudy afternoon, breezy on the hill tops, calm in the sheltered Tiger Shola canyon. 65°-70° F.

Specifically we stopped near the upper end of the canyon where the creek is more easily reached. Silver Cascade is located a bit upstream.

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STOP 236 - PALNI HILLS, S. INDIA:
KODAIKANAL, 2000 METERS,
800 specimens III-30-62

The immediate environs of Kodaikanal have been entirely disturbed by building and garden-planting. Many large trees are scattered ~~all~~ about

the park-like town, Poda and a large lake should have been good aquatic collecting spots but yielded very little from their shorelines, thick with reeds and water lilies. Most specimens were collected in the fields of grass, quite healthy and green from frequent showers. Camp - located in the compound of the Lutheran Lochend school.

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STOP 237 - PALNI HILLS, S. INDIA: 5 MI. E. TOP STATION, 2200 METERS, III-31-62
800 SPECIMENS.

Besides the approach from the east side the Munnar-Kodai road is the only other ~~approach road~~ serving Kodaikanal. The road winds along the wide "plateau" of gently rolling hills - downs, as they are called - S.W. of Kodaikanal, passes by Berijam lake where a branch road loops back to Kodai, and proceeds on to the edge of a steep ghat section. The hills are almost entirely grass-covered, though many extensive plantations of acacia and eucalyptus have recently been started. Here and there bare granite shows through the mantle of grass. The forest unit in the downs countryside is the "shola", a patch of native forest usually situated in a little valley or stream depression on the slopes. These sholas are scattered here and there throughout the downs. The elevation of the area varies from 6500 feet to over 8000 feet.

5 MI. E. TOP STATION marks the abrupt end of the downs at their western end. At this point the road descends 5 crooked miles of very steep cliffs and slopes, entirely covered with a dense,

tangled evergreen forest. Of all the accessible forests in the area this one is perhaps the most extensive. Indeed it would be an excellent collecting spot during the prime insect season. The little mountain road itself is ~~an epithet~~ fine collecting trail through an otherwise impenetrable jungle. The top edge of the forest, where trees meet the grass of the downs, is also a good place to sample the forest fauna as well as the downs fauna. These specimens were taken at the top of the ghat, where the road first meets the forest. Sweeping the herbage at the edge of the jungle as well as in the filtered shade of the trees was especially productive.

The forest here, ~~is~~ typical of the 6000 – 8000 ft. ~~level~~ zones in the hills of S. India, consists of small-leaved, evergreen trees 10 – 25 ft. tall, multi-branched and heavily twigged, with rounded crowns and moss-covered bark. Epiphytic growth is generally not extensive, however, because of a fairly long dry season. A thick understory of tall herbs (4 – 8 ft.) and seedling trees, while not always present in ~~these~~ this forest type, is a particular hindrance to walking about in this forest. The ground was moist when we stopped. The weather was partially cloudy, breezy on the heralds, warm in sheltered spots.

Top Station itself is located at the bottom of the steep ghat section ~~of the Road~~ and marks an extremity of the Kannan Devan Tea-growing country. A ropeway carries tea and supplies between Top Station and Munnar.

STOP 238 – S. INDIA: MARAYOOR, 27 MI. N.E. MUNNAR, 900 METERS, IV-1-62

1000 specimens

Marayoor, a small village located at the lower N.E.-side extremity of the ever-green forest of the Kharan Devan Hills, pinpoints this stop. The slopes around Marayoor are largely disturbed by agriculture and firewood cutting, but a good patch of native flora remains along the mountain stream which waters a large slope of rice terraces near Marayoor. The forest ~~type~~ here, while evergreen, ~~is small~~ differs greatly from the forests at higher elevations. The trees are much ~~larger~~ taller and their leaves are generally larger. The forest is more open overhead, but a dense undergrowth of bushes and the usual weed, lantana, prevents easy penetration. A good collecting trail follows the stream, on the uphill side of the road, however. Sweeping the herbage in the filtered shade of the forest proved productive for diptera especially. The forest edge bordering rice paddies was also a good collecting area.

Weather – hot, sunny, and humid (due to the stream moisture and rice terraces especially).

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STOP 239 – S. INDIA: COIMBATORE, 430 METERS, IV-2-62

350 specimens.

Specimens collected in the same area as those of STOP 205. Weather partially cloudy, breezy, and hot – 90°-95° F. Some rain had fallen between the first and second stops.

STOP 240 - S. INDIA: 4 MI. S. THOPPUR, 340 METERS, IV-3-62

100 specimens.

~~Countryside~~ Vegetation, like that of stop 200 at Thoppur itself, consists of ~~open~~, ~~dry~~, thorny bushes and small trees forming an open cover in ~~rocky~~ sandy ~~granite~~ hill country. While stop 200 was located on the slopes of the ghat itself, stop 240 was made at the foot of the grade, where the last sandy washes and scrubby trees give way to plowed fields. Specimens were collected primarily under stones around and beneath large tamarind and fig trees near the road. Soil — extremely dry and sandy.

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STOP 241 - S. INDIA: 10 MI. S.W. GUDIYATTAM, 350 METERS IV-3-62 50 specimens

Same locality as stop 199: flat, dry valley, of plowed fields (not irrigated), scattered villages, and scattered large trees. These specimens, largely butterflies, were collected in flower beds and a small alfalfa field in a private garden. 90° F.

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STOP 242 - S. INDIA: MADRAS, 5 MI. ~~SEA LEVEL~~, IV-8-62

150 specimens.

Some specimens were collected in the vicinity of the Ishardi Memorial at the south edge of town. Some of the native or secondary thorn-tree growth remains in a deer sanctuary there. The weather was very hot and the area dry. Most specimens, however, were collected in a garden in ~~town~~ the city itself. Parts of the garden received regular watering while others remained dry. Temperature ranged from 90°-95° F diurnal

to 80°F nocturnal.

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STOP 243 - S. INDIA: CHINGLEPUT, 2 METERS, IV-14-62, 150 specimens.

The countryside south of Madras, while largely dry open plain marked by a few irrigated areas, palm trees, and periodic towns and villages, is also characterized by many heavily eroded rocky hills of granite. The vegetation on these outcrops consists of small thorny bushes 1 or 2 feet high, euphorbias seldom larger than 4 ft., and other small xerophytes. Though the sky was clear and the temperature very high on the open slope of this ridge near Chinglepet, a heavy rain had thoroughly soaked the ground the night before. Specimens were taken under stones.

STOP 244 - S. INDIA: VEDANTHANGAL, 2 METERS, IV-14-62 1000 specimens.

Vedanthangal wildlife sanctuary, situated not far southwest of Madras, centers at a large shallow lake surrounded by ~~large~~ expanses of barren, dry, slightly rolling countryside. The lake is surrounded by small, rather scrubby trees; many trees are scattered through the lake as well - in the water and on small islands. These trees serve as nesting and roosting sites for thousands of water birds. Because of the availability of water, vegetation all around the lake remains green even in the dry season, and some paddy is grown at the fringe. The shrubs and herbage beneath the shoreline trees is in some places heavily coated with ~~bird droppings~~ fecal material from roosting birds;

sweeping the plants in these areas was particularly productive. A massive insect fauna supports also ~~a~~ a terrific spider fauna. Generally speaking, the huge numbers of small insects and spiders hinges upon the presence of water (rare in the eastern Madras area) and of ~~roosting~~ nesting birds, upon whose guano some of the first links in the food chain must thrive. The sun shone brightly from a cloudless sky during our short visit, and the humidity was extremely high. Temperature – 90°F – 95°F.

The shore of the lake, rich in leaf litter and guano, ~~also~~ was also a good area for beetles, flies, etc.

STOP 245 – S. INDIA:
TIRUPATTI, 132 METERS,
IV-18-62
1000 specimens

Tirupatti is a fairly large town situated in a broad, flat valley at the base of a high hill range. The valley itself is extremely dry during the dry season; while some of the area must grow rice and other crops, the fields were bare ~~during~~ in April, and much of the land is too dry the year around for crops. The valley is scattered with small trees and the roads, as ~~is~~ usual, are lined with large tamarind and other trees.

These specimens were collected in the garden of the Lutheran Mission on the out-skirts of town. In addition to many large trees – mango, and others, many shrubs and hedges had been planted. Still much of the garden retained

a "weedlot" look". Collecting under stones and on tree trunks was productive. A torrential thunder shower had just ceased and the entire area was thoroughly soaked.

Black light collecting in the garden was rich in ants and beetles. Evening temperature — 80°F.

Note change of date; specimen labels read IV-19-62 — should be changed to IV-18-62

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STOP 246 - S. INDIA:
TIRUMALA GRADE, 280 METERS
IV-19-62
75 specimens.

Tirupath is the hub city for several sacred places; the most famous is Tirumala (Tirumali, also spelled), located on the top of the range of hills just behind town. A wide stone-paved trail, trodden on for hundreds of years by Hindu pilgrims, ~~to the~~ serves several temples on the route to Tirumala itself, at the top of the range. In recent years an excellent road has been constructed to the top, winding around a more devious route than the steep trail. ~~Just~~ Bisecting some distinctive floral zones, both the trail and the road offer excellent access to good collecting. Though the rocky hills had been thoroughly soaked in a heavy thunder storm the afternoon before (see STOP 245), April is still basically in the dry season, broken only occasionally by these sudden but brief "mango showers. Therefore collecting was rather slow.

The vegetation is very interesting on this range. The trees rarely exceed 20 ft. in height and on the dries, exposed, rocky slopes remain as large bushes. The slopes have a definite scrubby look, beautifully accented in April by colorful new leaves and blossoms

bursting forth on bare branches. Most of the species are deciduous. Grass and small herbs form a ground cover among the rocks. Near the summit the forest becomes more dense, apparently due to slightly more rainfall, and evergreen fig trees are common among other larger species.

Geology — apparently schists and shales.

Hot, sunny morning.

STOP 247 - S. INDIA: TIRUMALA GRADE, 780 METERS, IV - 19 - 62

150 specimens.

Located not far down-grade from Tirumala

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STOP 248 - INDIA: CALCUTTA, 5 M. ~~sea level~~, V - 12 - 62

200 specimens.

A few specimens were collected in the Botanical Garden on the bank of the Hooghly River and a hot, humid morning; a small number ~~all other~~ were taken in the Zoological Garden at Alipore.

All other specimens were attracted to the lights of the ship ~~anchored~~ tied to a Garden Reach dock across the river from the Botanic Garden. The lights ~~facing~~ facing the garden drew in most of the specimens while those facing the warehouses and the dense part of the city attracted little.

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STOP 249 - EAST PAKISTAN: CHALNA, 3 M. ~~sea level~~, V - 24 - 62

Chalna is a young Pakistan port, still in a very primitive state, recently born out of the swampy Sunderban country. At this time no town exists ~~ashore~~ near the river side warehouses, though stacks are scattered about; cargo is shipped by barge farther up the delta stream to a small town with land communications. The ships tie up in mid river just at the upper fringe of the mild Sunderban jungle, where the rice paddys have at last penetrated the partially flooded delta.

Two nights were spent

moored in the river, and the ship lights drew in these specimens from the surrounding disturbed countryside, being a bit out of range for the true undisturbed Sunderban jungle. The diurnal temperature wavered ~~to~~ between 90°-100°F, and never cooled quite to 80°F at night. Humidity remained very high.

100 specimens

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SINGAPORE ISLAND,
MALAYA, THAILAND,
CAMBODIA

STOP 250 - SINGAPORE:
SELETAR RES., 25 FT.,
VI-3-62
600 specimens.

Seletar Reservoir, located on north-central Singapore Island, is surrounded by a fairly large forested area. Low, rolling hills are densely covered by evergreen jungle. The trees are rather smaller in stature than the virgin timber in the Bukit Timah reserve, and much Pandanus and other undergrowth makes much of the forest nearly impenetrable. The area was quite moist from periodic rains several days earlier. Weather - clear and hot - 90°F, humidity high. Most specimens were collected in ~~the~~ filtered shade in the forest understory, though some were taken along the lake shore and along a small road penetrating the thicket.

STOP 251 - SINGAPORE:
BUKIT TIMAH, 100 FT.,
VI-4-62
1000 specimens.

Bukit Timah Forest Reserve occupies one of the highest hill areas on Singapore Island. The forest, though not extremely large, covers very steep countryside. Many trails create excellent accessability for collecting in the understory, and some sunny border areas can also be reached. The trees are quite tall and the understory thick in most places. Most specimens were collected in filtered shade. The ground was still quite moist from recent rains.
Weather — sunny — 90°F — humidity high.
All trees — evergreen.

100 ft. represents a sort of average altitude.

STOP 252 - MALAYA:
11 MI. S.E. SEREMBAN,
100 METERS, VI-6-62
50 specimens.

Stopped briefly in a large clearing bordering dense jungle. The forest had been cleared for rubber planting; in fact the small trees had already been set out. The ground was littered with standing and felled stumps & logs. Most specimens were collected under bark flakes. Weather — partially cloudy, late afternoon — 85° — 90° F.

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STOP 253 - MALAYA:
K. LUMPUR, 90 METERS,
VI-7-62
1000 specimens.

Because of periodic rainfall the year around Kuala Lumpur is always green. Even in well-trimmed, well-

mowed gardens there are many niches for insects, and neglected corners and weedlots are excellent collecting spots. With the exception of one small forested hill in the city the area is highly disturbed either by building or planting. Natural forest, however, can be found, besides on the small hill, only a few miles out of town.

These specimens were collected in various gardens and weedlots around the city; most insects, however, including all the sweepings, were taken on the grounds of the Institute for Medical Research. Sweeping herbs and grass in the shade of large trees was especially productive.

Weather – hot – 90°F – humidity high. Ground moist. All plants lush and green.

STOP 254 – MALAYA:
16 MI. N.E. K. LUMPUR,
1000 FT., VI-8-62
3000 specimens.

NOTE – Some of the larger ~~labels~~ labels read "13 MI. N.E. KUALA LUMPUR" and the elevation is ~~not 1000 ft~~ 300 METERS. These should be changed to the above corrected label. "Kuala" does not need to be written out but may be abreviated "K.".

The Gombak Road, one of two main passes across the Western Hills, follows the Gombak drainage system on the western slopes and is bordered by the Ulu Gombak Forest Reserve. Once above the lowlands, disturbed by rubber plantations, etc., one enters an extensive belt of mountain evergreen rain forest. The pass itself is scarcely higher than 2,000 ft, and the forest zonation does not change radically in that

altitude, though there are undoubtedly some differences. Two stops were made on the grade, one at 600 meters (STOP 255), and this in the vicinity of 1000 ft. Some specimens were collected in a clearing just on the 1000 ft. contour in which one house (one of the few buildings on the grade) had been constructed. The clearing had been made between the road and the Gambale River in the bottom of a V canyon a hundred yards below the house. Aside from the actual clearing and a few small trails, the forest ~~remained~~ is completely intact. At this altitude, on the slopes of steep, rounded hills marked by often rugged stream canyons, the forest canopy averages about 120 – 140 ft. above the slope; the trees are often vine-entwined and fern-covered. The understory consists of small herbs, thickest of course in sunny patches, club moss, ferns, moss, and small seedlings and shrubs 3 or 4 feet high. Sweeping in the understory was productive. Collecting was also good along the road and stream, where the sunny exposure and rich plant growth attracted much of interest.

A second major collecting area included in this stop was located at a slightly lower elevation in the same lime zone. A small logging road follows a Gambale tributary up a little valley on the north side of the river. With the exception of a small amount of selective logging the forest is almost untouched. Of course the very presence of the logging road clearing creates a somewhat unnatural situation and enables population explosion among certain weeds, but the result is ideal collecting conditions. Many high-flying

insects drop down along the clearing from the canopy and are more easily collected. The road and stream form a perfect butterfly flight-way, and puddles and ~~streams~~ are quite inviting as butterfly drinking spots. Some recently cut logs were attractive to beetles. Exposure of herbage and both shady and sunny ~~slopes~~ road banks is excellent.

Three collecting days were spent at this place; the average date, VI-8, is used. ~~The weather during this time was~~ Weather — sunny mornings, cloudy afternoons, rain periodically in the afternoon, evening, or pre-dawn. 90°F diurnal, 80°F nocturnal temp., cooling to 76° or 78°F after a rain. Ground always wet. Heavy dew in the mornings.

STOP 255 – MALAYA: 22 MI. N.E. K. LUMPUR, 600 meters, VI-9-62
1000 specimens.

A second stop on the Gombak road was located just a couple of miles below the summit of the pass. In this area the forest is completely untouched. The canopy is 120-140 ft. above the steep slopes; many of the trees are extremely large, and epiphytic growth is extensive. At the 22nd mile a trail traverses virgin understory growth in a beautiful ever-green rainforest, from the Gombak Road directly down the steep slope to the River, perhaps three quarters of a mile trail distance. The trail ~~serves~~ one of Dr. ~~Elliott~~ Elliott McClure's forest study areas ~~and~~ which includes an impressive ~~study~~ platform constructed 140 ft above the forest floor in a large tree for the purpose

of ~~studying~~ observing ~~the~~ life in the canopy.

These specimens were collected exclusively in the forest understory; — sweeping the herbage near the stream was especially productive for small Diptera, etc. Weather — sunny, with occasional clouds. ~~Air night collect.~~ 85-90°F

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STOP 256 - MALAYA:
12 MI. N.W. K. LUMPUR,
120 meters, VI-15-62
150 spec.

Some of Malaya's most interesting geological formations are the limestone ~~blocks and~~ outcrops, centered near Ipoh but scattered ~~also~~ elsewhere, west of the western mountain range especially. These steep, forested crags and bluffs contain myriads of caves both large and small, one of the most noted of which is Batu Caves near Kuala Lumpur, whose fauna has been surveyed by Dr. Elliott McClure. A few miles from Batu Cave, in Templer Park Forest Reserve, is a cave named Gua Arak Fakun, entered by means of a small opening, hidden in jungle and fig roots, at the base of a large limestone bluff. The cave has remained little disturbed by man. Apparently some troops used the cave for a short time during World War II but was either partially sealed up or otherwise made inaccessible during following years of political unrest in Malaya. At any rate, naturalist interest in this cave has only recently begun. Dr. Fred Dunn, of the Hooper Foundation (Inst. for Medical Research, K. Lumpur), is currently studying the fauna of the cave.

STOP 257- MALAYA: 6 MI. S.W. BENTONG, 140 meters, VI-16-62
150 specimens.

Short stop in rolling hills planted with rubber. These specimens were collected along a small creek dissecting a slope in an old rubber plantation. One small patch of tangled jungle remained along the creek (a band of undergrowth only 50 yards wide). Condition of the ground and rotting logs — quite moist. Weather sunny, warm, humid.

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STOP 258 - MALAYA: FRASER'S HILL, 4200 ft., VI-17-62
2000 specimens.

Fraser's Hill, a high point on a long range of hills, is a pleasant hill station. The visiting and resident populations of the town are small and neat stone buildings have been ~~constructed~~ widely

spaced with a minimum of destruction of the natural environment. Even around ~~and~~ the golf course a thick stand of tree ferns remains.
Tree ferns are in fact one of the commonest forest plants in this zone. The trees are of course evergreen and generally small-leaved.
The canopy averages perhaps 50 ft. above the forest floor. The jungle is generally quite dense and nearly impenetrable, but several fine cantons trails around the hill below the town offer excellent collecting exposures. The trail and road banks are thickly covered with moss, ferns, club-moss, and small flowering herbs. Sweeping these areas yielded a quantity of small Diptera, Hymenoptera, and Coleoptera, WHILE the trails offer good understory possibilities the roads and open grass parks in the town, situated on the rolling hill top, offer access to other sets of insects — some of the butterflies and bees, especially ~~which~~ which normally would frequent the canopy were the forest entirely undisturbed.
The one day spent at Fraser's Hill turned out to be cloudy throughout and the temperature averaged 70°F. Black light collecting was interesting; evening temperature dropped to 60°F, the sky remained partially or thinly overcast, and a nearly full moon cast a half-light through the clouds.

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STOP 259 - CAMERON HIGHLANDS, MALAYA: JOR CAMP, 600 meters, VI-18-62
50 specimens

Jor is one of the supply camps (actually a small town) for an extensive hydroelectric project being constructed in the canyon below the town

of Cameron Highlands. 600 meters is somewhat below the major tree fern level; the evergreen rain forest here consists of quite large trees and a tangle of large bamboo, palm, and seedling understory. These specimens were collected during a quick stop along the road, in a thick growth of grass especially. Forest moist from recent rains.

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STOP 260 - CAMERON HIGHLANDS, MALAYA: G. BATU BRINCHANG, 6500 ft., VI-19-62, 700 specimens.

6,664 ft. Gunong Batu Brinchang, only 522 ft. lower than Malaya's highest mountain (Gunong Tahan, 7,186), exhibits a life zone present on a very small number of ~~the higher~~ Malayan mountains. The major tree fern belt thins out at about 6,000 ft. on Brinchang Peak, though many individuals grow in protected spots nearly on the summit. (Throughout their MALAYAN range tree ferns occur scattered thinly or thickly among the forest trees). Coexisting with the tree ferns at and above their upper fringe is a short forest, rarely higher than 50 and usually averaging 30 ft. above the ground, consisting of small-leaved evergreen trees, among them many species of oaks and chestnuts. Around the summit itself the trees are scarcely 15 ft. in height. But the most interesting aspect of the forest above about 6,000 ft. is the ~~immense~~ extensive growth of moss ~~on~~ ground and tree and the festoons of orchids, ferns, and other epiphytes clothing the trees so thoroughly that sight of bare bark is indeed a rarity; as the trees grow up and the understory develops and ~~the~~ dead wood accumulates on the forest floor the moss and ferns cover everything so

that eventually a considerable layer of spongy peat develops (in fact, sphagnum moss is an important component of the ground moss formation). In places of heavy moss growth and piling of forest litter a layer of peat perhaps as much as 5 to 10 ft. thick may develop and is so unstable that a single jump will set the whole area, trees and all, ~~into~~ vibrating and trembling. Peat formation seems to be heaviest on ridge tops where the ground is more or less level. An excellent trail follows one such ridge from the 6500 ft. level several miles to another summit to the west. Perhaps the finest moss forest on the peak can be intimately viewed along this trail. In some places the moss and orchid growth is so extensive in the tree tops that a solid roof is formed, and examination of a fallen tree showed that peat formation had been taking place in the upper branches for a considerable period of time; in fact, a blade soil had developed as well.

The second major ridge, nowhere very steep along its crest, has been usurped ~~for~~ for the small road which leads to telecom towers on Brinchang's summit. This ridge and ~~probably~~ the ~~summit~~ itself probably also had excellent cloud forest growth which has been destroyed. Nevertheless the road and towers represent the only scars on an otherwise untouched peak, and one is immediately impressed with the ~~fact~~ tremendous expanse of virgin forest to the west (nearly to the base of the hills on the Ipoh side) and to the north along the mountains. Considerable deforestation has taken place around the town of Cameron Highlands, for tea and Chinese farming, but on the whole the Cameron area represents an immense

tract of wild country. On Brinchang the road is actually advantageous for collecting since butterflies and other high flyers, normally above the canopy, come down along the roadside growth.

Clubmosses, lichens, ferns, and mosses grow extensively everywhere, in sun and shade. In the forest understory, growing among the mosses, one finds many orchids, wild begonias, pitcher plants (with their specialized fauna), and myriads of other wild flowers. ~~Some~~ Undergrowth of small palm-like plants and delicate bamboo reaches the summit, but palms are thicker in creek bottoms around the 5500 and 6000 ft. levels.

One day and 2 nights were spent on Brinchang. Camp was situated at 6500 ft on a wide shoulder by the road, behind a hill bank. The road ahead dipped slightly along a saddle on the ridge crest, bordered by a terribly precipitous but forested cliff on the west, the windy side, and by a protected canyon filled with tree ferns and broad-leaved undergrowth on the east. From the saddle the road ascends to the summit, less than a 5 minute walk from Camp. Though ~~the~~ air movement never exceeded a breeze, the hill proved to be a good protection for black light collecting.

The weather pattern during ~~one~~ one day was probably a typical, ~~[illegible]~~ the morning began sunny and warm, scattered clouds mostly below the peak; by afternoon the sky ~~had~~ clouded over, and by evening mist began to blow periodically across the summit. Rain fell from about 5 P.M. until an hour past dark, then stopped. Insects immediately came to the black light. Collecting ~~[illegible]~~ lasted perhaps 1½ hours but ceased suddenly when rain fell again.

The previous night no rain fell, though the sky was cloudy, and collecting was not as good. The Brinchang moth fauna is quite beautiful. Nearly all species exhibit protective coloration, adaptation to moss, bark, lichens, and dead leaves. The variety of protective color patterns was ~~quite~~ very interesting.

Diurnal temperature did not exceed 70° F; nocturnal low, 55° F, about 60° during black light periods.

Bumble bees began flying at the break of dawn and ceased after dark.

Underlying rock apparently granite.

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STOP 261 - CAMERON HIGHLANDS, MALAYA: 4 MI. N.E. JOR CAMP, 800 METERS, VI-20-62. 1000 specimens.

4 miles up the grade from Jor Camp there is a fine collecting dell on the bend of the road. The creek canyon here has a relatively flat bottom surrounded by steep sides and a high, vertical rock face looking in the end, over which the creek falls into a pool at its base. The floor of the dell is thickly littered with fallen logs, bark, and leaves, and a deep layer of black soil is present. The forest canopy averages perhaps a hundred feet in here. Large palms, some tree ferns, and small trees form a mid-story, in which, beneath, in filtered light, small herbs, ~~and~~ bushes and ferns thrive. Sweeping this understory yielded good flies, etc. The forest floor was of course very damp from frequent rainfall.

Warm, sunny morning - 80° F.

1 MI. DOWN ROAD from RINGLET

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STOP 262 - MALAYA: IPOH, 70 meters, VI-20-62. 100 specimens.

Ipoh is a flatland town

not far from the base of the hills (Cameron Highlands area) and closer still to limestone bluffs. The best forest in close proximity to town seems to be that on these bluffs, for much of the lowland forest has been cleared for rubber-growing and tin-mining. These specimens were collected largely at the blacklight in a yard along Gopeng Road, near the edge of town. The yard was planted in lawn, shrubs, and flowers ~~near~~ beneath some large trees, with a vacant weedlot next door. Weather, warm (80-90) diurnal temp, 80°F evening, partially cloudy.

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STOP 263 – MALAYA: 3 MI. S.E. IPOH, 50 meters, VI-21-62 600 specimens.

Ipoh is the center of limestone formations, common along the western side of the west mountain range. These steep-sided crags rise directly out of the coastal plain near the foot of the hills. Forest covers every possible slope, though many faces are sheer and vertical with no root holds. Nearly every hillock is riddled with caves and from many of the overhangs and cave entrances elaborate stalactite formations have developed.

Located about half a mile off the main Gopeng-Ipoh road there is a remarkable limestone hillock shaped roughly like an enormous barnacle. Within a circular wall, densely covered with jungle, is a large hollow whose floor approximates the level of the plain outside the limestone wall. This circular enclosure, perhaps a hundred yards in diameter, was years ago planted with rubber trees, and, though the place is largely overgrown,

the trees are regularly tapped by an old Chinese fellow. The hollow can be reached only by means of a narrow ~~limestone~~ cave through a hundred feet of limestone. Clambering over the precipitous walls would be extremely arduous. The enclave is a perfect little collecting unit and would make a splendid confined area for a thorough insect survey. There are sunny spots as well as places in deep shade, and caves and cave entrances are also present. The flora on the limestone cliffs and ridges surrounding the enclosure has never been disturbed.

These specimens were collected primarily in the enclosure itself, though some were taken at the fringe of the rubber plantation outside.

Temperature - 85°-90° F, humidity high. Sunny morning.

STOP 264 - MALAYA: 2 MI. E. GOPENG, 100 meters, VI-21-62
700 specimens

A ~~small~~ little dirt road last from the town of Gopeng serves a small water supply filter bed in a creek valley, just at the foot of a group of hills. Below the filter bed clearing the land has been disturbed by aboriginal farmers - deforestation on the slopes, resulting in secondary grass growth, and some rice planting on the flat just at the base of the hills. But above the filter beds, where the canyon steepens and narrows, the steep slopes are clothed in almost untouched jungle whose top story averages about 75 - 100 ft. above the floor. Collecting was best along the edge of the clearing, and the creek acted as a good butterfly flightway, as did the road farther down.

The afternoon of collecting began sunny, became partially

cloudy, and heavy rain fell late in the afternoon until shortly before dusk. Temperature stayed up around 80 nevertheless, cooling slightly in the evening. ~~The rain fell after dusk.~~ A light rain continued for an hour and a half after dark but light collecting was good throughout this period.

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STOP 265 – MALAYA: PENANG HILL, 100 meters, VI-26-62
500 specimens.

This stop was located at the 100 meter level on the main hill of Penang Island, at the end of the road into the water catchment area. This extensive tract of native vegetation, the watershed for Penang, is probably one of the best collecting areas on the island, though at the time of our ~~stay~~ visit collecting was rather slow. The forest looks undisturbed, but in the past some selective cutting must have been carried on. The sky remained partially cloudy all the time, sunny periods alternating with cloudy or rainy periods. Several small showers blew up by afternoon, and heavier rain fell at night. Temperature ranged close to 80°F, slightly more or less.

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STOP 266 – MALAYA: KEDAH PEAK, 3300 – 3978 FT., VI-28-62
800 specimens.

Kedah Peak (Gunong Jerai), though not very high in elevation, is biologically unique because of its close proximity to the sea and its isolation from other mountains. Situated between Penang on the south and Alor Star on the north, directly overlooking the sea on the west, the wettest side of Malaya, Kedah Peak receives a high annual rainfall, exemplified by rich moss, orchid, and other epiphyte growth.

Specimens were taken over a period of 3 days and 2 nights between the rest house, at nearly 3300 ft., and the summit of the peak, 3978 ft. All black light collecting was carried on in camp, in the vicinity of the rest house. The weather remained partially cloudy during both days, and at no time did the sun shine for very long. Diurnal temperature ranged from 10° to 15° F, though full sun was extremely hot. A low of 65° F was recorded, early morning. Evening temperature, 70° F. The peak was enshrouded in clouds the first evening and light rain fell. Collecting at the light was quite good. Insects failed to appear ~~at the~~ when hard rain fell later, however, after which a terrific storm, with strong winds and heavy rain, ~~[illegible]~~ blew in from the west. Rain continued throughout the night and finally let up by noon the second day. Cloudy skies reduced collecting in the afternoon. The second night, relatively clear, proved quite unproductive. Many specimens were taken on a hike to the summit the third morning, though the sun shone only periodically. A narrow road has been constructed to the top to serve a telecommunication station, but the trail gives closer access to the forest understory. The flora in this zone is quite unique and differs markedly from comparable altitudes in the Cameron Highlands and other parts of large Malayan ranges. Tree ferns are not present above 3300 feet, though a few scattered specimens were observed at lower elevations. The presence of a native ~~conifer~~ Cryptomeria-like conifer, from about 3200 ft. to the summit, is another distinctive floral feature. Near the rest house some of the trees reach 30 to 40 ft,

but near the summit the plants seldom exceed bush size. Moss and orchid growth is especially extensive within the last 200 ft. elevation.
The geology on the upper slopes of the peak is quite rocky and the soil cover is thin. Ground saturated.

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STOP 267 – MALAYA: KEDAH PEAK, 350 FT., VI-29-62
500 specimens.

The lower slopes of Kedah Peak are biologically quite distinct from the upper slopes. From the plain ~~up~~ for several hundred feet of elevation there is a belt of dense evergreen rainforest, extremely rich in wildlife and apparently untouched by man; the narrow mountain road and footpaths are the only penetrating scars and become excellent collecting lanes. The forest canopy perhaps averages 25 to 100 ft, though many emergent trees, 140 ft. or more, protrude above the surrounding top story. One distinctive feature about the forest at this level is a dense middle story of palms, whose leaves reach a height of perhaps 20 ft. Beneath this light screen the ground is practically bare ~~bare~~ and an understory of herbs and shrubs flourishes only where the light breaks through, along trails and the road especially. The forest floor was moist though not as saturated as that of the summit area. Heavy rainfall average is exemplified, however, by rich epiphyte growth — stag's horn and birds' nest ferns, orchids, etc. — on the forest trees. Vines and creepers are common.

Road banks in such a forest ~~are~~ offer excellent places for vespid nesting and several nests and associated wasps were collected. The wasps prefer the overhang niches because they remain dry, protected from heavy rain. Thin roots hanging from the overhang ceiling or sticking from the bank are

utilized most of the time.

As usual for lowland areas, the low temperature came to about 80° F, high, during partially cloudy weather, about 85° F.

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STOP 268 — THAILAND:
20 MI. W. PHATALUNG, 150 METERS,
VII-1-62
200 specimens.

Pinpoint data on this collecting area is as follows:

PHATALUNG Province, PHATALUNG District — BANNA (village), near KHAO PHAP PHA mountain, on the eastern drainage of the Makhon Range — at the 150 meter level, east side of the low pass (road) crossing the range.

The forest here consists of fairly large trees, medium trees, and an understory of small palms, vines, seedlings, and herbs forming a rather dense tangle. Some selective logging has been

NOTE — SPECIMEN LABELS READ "10 MI. W" — CHANGE TO 20 MI. W

done apparently, and the area showed signs of recent elephant trampling. Following one creek, in fact, we found ~~one~~ a wild elephant busily splashing mud about the creek-side herbage, ripping up the vegetation, and in general making a mess of the place. Nevertheless collecting was excellent. Being in a somewhat drier zone, the east side of the range is ~~a bit drier than~~ not as moist as the west side, though the growth appears to be nearly as lush.

Short afternoon stop — sunny — 85°-90° F — humidity high.

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STOP 269 - THAILAND: KRACHONG FOREST, NR. TRANG, 100 METERS,
VII-2-62
3000 specimens.

An extensive tract of forest on the lower western slopes of the Makhon Range, southern Thailand, has been set aside

as reserve forest and is used by the Forestry Department for experimental forest studies. The area is reached by way of a small road leaving the main trade first at the foot of the last of TRANG grade on the west side, some distance up a stream valley there is a rest house overlooking a large clearing and the rocky stream bed. The surrounding forest in this relatively flat area has been cleared ~~some parts~~ of understory, leaving only the large trees. Some grass and native grass in the filtered light garden has been planted near the rest house - hybiscus, Croton, etc.. The blade light was situated near the rest house facing out across the stream to virgin forest on the other side, 150 distance, and backed by native forest 75 yards to the rear.

From the rest house the road roughly parallels the stream through ~~a thick jungle~~ the forest, gradually climbing the gently sloping valley, and ends finally at the base of a high waterfall Cascade. At this abrupt end of the valley the slopes rise steeply to the top of the ridge, which can be reached by way of trails.

~~B~~ Krachong Forest, being on the western side of the range, receives very heavy rainfall. Three days and 3 nights were spent in the area (the mean date, VII-2, was used), during which the sun shone brightly only periodically. Heavy rain fell frequently, usually in the afternoon or night, and the forest was continually wet and often dripping. Accessibility for collecting in the understory of herbs, club moss, and small shrubs is excellent at Krachong for many trails ~~cut through~~ are available. The stream itself is ~~also~~ a good collecting path, passing through the filtered forest light as well as full sun in wide, more open areas.

The jungle is typical low altitude rain forest - tall trees draped with vines and

epiphytes. Some Pandanus grows near the waterfall and occasional palms join the middle story. A deep layer of rotting leaves and branches covers much of the forest floor and becomes an excellent medium for herb, fern, and clubmoss growth.

Average diurnal temperature, 80°F; low recorded after night rains, and early morning — 70°F.

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STOP 270 - THAILAND: TUNG SONG, 75 M., VII-4-62

500 specimens.

Tung Song, ~~is~~ a major railroad junction in southern Thailand, ~~the town~~ is built on flat ground in open agricultural land marked by striking limestone bluffs, forested rocky crags jutting out of the rice paddy plain.

Specimens were taken within the town. Collecting in the herbage and low bushes bordering ~~village~~ town klongs and creeks was productive, and hymenoptera were abundant at blossoming garden vines. ~~in gardens~~ Weather — hot, humid, partially cloudy.

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STOP 271 - THAILAND: 40 MI. S.E. PRACHUAB, 75 METERS, VII-5-62

Monsoon type forest of large trees, open foliage, some deciduous species. Understory of bamboo, thornbushes, shrubs, and some grass in the clearings. In general, a fairly ~~dense~~ tangled but open, light, dry forest. Though the ground was slightly moist, rather dry conditions prevailed. Nearly close evening, quarter moon shining through the trees. Black light located directly in the forest, in a narrow clearing, with no large flight lane to draw from. Insects were attracted from nearby foliage and from a restricted flight range. Diurnal material collected

late in the afternoon. Weather warm but less humid than usual because of the dry countryside.

100 specimens

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STOP 272 — THAILAND: PRACHUAB,
2M ~~SEA LEVEL~~, VII-6-62
200 specimens

This pleasant seaside resort is situated in a dry area on the east coast of the peninsula, in the rain shadow created by a N-S range of hills ~~[illegible]~~ on the west. Much of the area is low and flat, though ~~the~~ two points marking off the shallow bay ~~[illegible]~~ consist of rugged limestone hills, covered with a mixed evergreen and deciduous, dry forest. Cycadaceae grow here and there on the rocky slopes. North of Prachuab low hills support a bamboo and thornbush flora. Dry mud flats just inland from the town have a speciose grass and scrub brush flora.

These specimens were taken on a partially cloudy, windy morning, in open fields just behind the beach, between sand and the foot of one limestone hill. Butterflies were especially common in the bushes ~~[illegible]~~ at the foot of the rugged slopes, and many were collected on small composit flowers in the fields behind beach cottages. Sweeping grass and blossoming beachside ~~[illegible]~~ creepers was productive for bees and small insects. Apparently no rain had fallen for a long period; many of the shrubs were rather wilted and the soil was parched.

85°F.

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STOP 273 - THAILAND:
10 MI. N. SARABURI, 100 METERS,
VII-11-62
1000 specimens.

Situated ~~at the~~ in gently rolling countryside, at the

northern fringe of the Bangkok rice bowl, the PUKAE BOTANICAL GARDEN and surrounding Royal Forest Department experimental areas are excellent spots for insect collecting. Many large native and planted trees grow in the botanical garden. The natural tangled understory has been cleared and a thick carpet of herbs and grass, 6" to 3' deep, covers the dead leaves on the ground. Most specimens were taken in this herbage in filtered light or complete shade, though collecting in deep grass and taller bushes in the full sunlight of clearings was also productive. Ponds and a small stream, bordered by grass, were good spots for Odonata and Orthoptera.

Black light, set up on a hilltop near the rest house, attracted small aquatics and a few moths, but collecting was not ~~much~~ spectacular. Heavy rain fell late in the afternoon and early in the evening, and the sky remained cloudy, with sporadic rainfall during light collecting. ~~The surrounding hills are~~ The vegetation on surrounding hills is entirely disturbed; small trees (some planted teak) and secondary growth, everywhere in full leaf and lush growth of the rainy season, comprise the main flora.

Diurnal temperature – 85°F, weather very humid, partially cloudy.

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STOP 274 – THAILAND: YAN HEE DAM, 250 METERS, VII-13-62
100 specimens

This very large hydroelectric project, under construction by a Utah company, is situated in rocky hills west of the main N-S. Bangkok – Tampang road. The life zone is geared to a monsoon climate — rainy season beginning in July,

long dry season during a cooler winter. Most of the trees are deciduous, among them teak. The hills support an open forest of Shorea sp. primarily, averaging 20-30 ft. in height, with an understory of bamboo, (5 ft high), ~~and~~ grass (2 ft.), and scattered broad-leafed herbs and woody bushes. Stratified schists, containing a large amount of mica, have crumbled and strewn the slopes with loose stones. The soil is soft and loose but heavily beaten by rain. The flora displayed the full lush growth of the rainy season but showed definite signs of fire during the dry season.

Some of the specimens, largely hymenoptera, were collected at hybiscus and other flowering bushes in the community not far from the dam. Grasshoppers and other groups were taken in the grass and bamboo understory of the light, open forest on the slopes above the dam.

Weather ~~Sunny~~ overcast, sporadic →

STOP 275, THAILAND:
MAE CHIANG HAI, 200 METERS,
VII-13-62
100 specimens

A short morning stop in a flat forest largely of Shorea about 30 ft. tall. Open, light forest with an understory of low, scattered bushes, occasional palms 5 ft. high, and many cycads 2 ft high. Ground grey, loose and somewhat sandy, heavily beaten by rain, and nearly bare of vegetative cover.

All specimens in alcohol — taken primarily under rotting logs on the forest floor.

Ground wet, slightly drier under larger logs. Weather overcast, periodic showers.

80° F.

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light rainfall. Temperature, average 80° F.

STOP 276 - THAILAND:
10 MI. S.E. LEE, 600 METERS,
VII - 13 - 62
50 specimens.

Mostly nocturnal material from a hilly zone on the road to Chiang Mai, 20 miles from the junction with the main N-S road. Light, open forest of mixed deciduous and evergreen trees, some with very broad leaves. All vegetation in full growth of the monsoon season.

Camp located in the spacious clearing of a P.W.D. work camp and bungalow, surrounded by forest. Weather - Cloudy, sporadically rainy - 75°F.

Also included in this stop are several large black Cerambycids collected along the road between 10 and 15 miles S.E. of Lee and from 500 to 600 meters altitude in the forested hills. These large-mandibled beetles were flying low through the forest and across the road during a heavy rain shortly before dusk. One additional specimen was brought in by a native early in the morning.

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STOP 277 - THAILAND:
20 MI. N.W. LEE, 380 METERS,
VII - 14 - 62

Short morning stop in gently rolling, forested countryside. Open, light mixed deciduous and evergreen forest, with probable emphasis on the broad-leaved deciduous species. Trees 20 to 40 ft. high, in full rainy-season leaf. The understory of young trees, small bamboo, grass, and leafy herbs was productive for insects in spite of cloudy weather and periodic light showers. The forest was thoroughly soaked.

Cut logs along the roadside had some beetles beneath their bark.

Fire had burned through most of the ground cover during the dry season. Small fires are built by

the local tribes for the cremation of their dead; small cremation clearings, with offerings of various kinds, were scattered here and there in the forest. This might explain the excellent condition of the plot and the presence of many large trees, whereas the forest on the opposite side of the road had been cut over for timber.

200 specimens

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STOP 278 - THAILAND:
CHIENG MAI, 300 METERS,
VII-14-62 800 spec.

Chieng Mai is located in a long, broad valley bordered on the east and west by low ranges of hills. Much of the valley is planted in rice during the wet season.

These specimens were collected in 3 areas. One open, grassy field near the railroad station was productive; Hymenoptera and Diptera were taken on a kerat-weed like flower growing in flooded parts of the field. Another recently cleared field in a residential district on the W. side of the river proved good because of a few blossoming bushes. A dense tangle of vines, bushes, and other secondary growth blanketed much of the field.

The Zoological Park, at the outskirts of town right at the base of Doi Sutep, has cultivated areas as well as natural deciduous forest. A few specimens were collected on the garden plants.

Weather - partially cloudy, warm, humid - vegetation wet from periodic rains.

~~STOP 279 - THAILAND:~~
~~E. SLOPE, DOI SUTEP,~~
~~560 METERS, VII-15-62~~
~~800 specimens.~~

Tortoise shell beetles - feeding on a bush morning glory planted in the Zoological Park.

800 specimens

DOI SUTEP.

Doi Sutep, the closest mountain to Chiang Mai, has been made easily accessible by a road recently constructed to its summit. Three ~~very~~ noticeably distinct life zones offer an excellent profile of northern Thailand vegetation. Typical moss forest, found on a few of Thailand's peaks at higher elevations in wetter zones, is lacking on the summit of Doi Sutep, a bit over 4500 ft in elevation. Collecting stops were made at various levels in the three major zones. The weather left no doubt of the presence of the rainy season; at no time was the sky clear and seldom did the sun shine for more than a few minutes. The vegetation is obviously adapted for a distinct dry season, however, though during this month, with the monsoon nearly in full swing, all the life zones displayed rich leaf growth.

STOP 279 – THAILAND:
E. SLOPE, DOI SUTEP, 560 METERS,
VII-15-62
800 specimens

The lowest life zone on Doi Sutep is a deciduous ~~woodland~~ woodland, typical of low northern Thailand hills. Oaks, teak, Shorea or Shorea-like species, and other broad-leafed trees partially or fully deciduous, together with large bamboo clumps on some exposures, comprise the flora between 20 and 40 ft. in height. The trees are not close together, the foliage is rather loose and open, allowing full sun to ~~penetrate~~ hit much of the slope. During the rains the ground is covered with herbs, grass clumps, small bamboo, and small tree seedlings & bushes; on the more exposed slopes grass is most common, grows in clumps spaced further apart, leaving exposed patches of ground.

Walking about is quite easy, and collecting on the understory foliage is usually excellent.

An old house site on a flat-ridge became an excellent camp: The black light was placed in a large clearing surrounded by native trees. A few mango trees and other garden plants, overgrown by more vigorous natives, are all that remains of the garden disturbance.

The days remained partially cloudy with periodic light rains. A thin overcast lately at night allowed much light from the nearly full moon to illuminate the countryside, doubtlessly contributing to the poor night collecting.

Heavy rain fell later in the night. The sand and gravel slopes were thoroughly soaked, though some of the roadbanks were still dry in spots.

Specimens were collected over a wide range of slope exposures in this zone, from steep, sunny exposures to stream ravines. Many little streams and creeks draining the slopes were excellent for Odonata.

This altitude is reached about 12 miles drive W. of Chiang Mai.

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STOP 280 - THAILAND:
E. SLOPE, DOI SUTEP,
875 - 950 meters, VII-15-62
800 specimens.

(note - some lasered specimens bear only 875 meters on their labels. These were collected at that altitude but no doubt occur also at least as high as 950 meters, in the same zone. The printed label will read "875 - 950 meters", which will include these specimens also)

This zone differs strikingly from the lower deciduous forest. Most of the trees are evergreen, of larger stature, and smaller leaves. The forest might be called "monsoon rain

forest", a type which experiences several months of comparatively dry climate. This evidently is a wetter zone, on the yearly average, than the deciduous forest below. The trees grow more closely together, vines reaching to the tree tops are common, epiphytic growth is noticeable but certainly not extensive, and understory growth is taller and more permanent. Fallen branches and some logs cut for forestry experiments are scattered about through the understory of grass, bushes, and tall herbaceous plants. One excellent collecting spot, (located a few hundred yards up the road from the monastery parking area) was a stream valley below the road, overstudded by tall trees with dense foliage, used by the Forestry Department for experimental planting of seedlings. The small trees and some undergrowth had been cleared, leaving a carpet of low-growing herbs and small shrubs and some swamp-loving plants along the creek. Collecting in this area at 950 meters was excellent even during light showers.

The black light was placed across a dirt side road at 875 meters elevation (about 15 road miles W. of Chiang Mai), surrounded by fairly tall forest and the usual roadside "weed" and thorny vine growth. Collecting was poor at the light, perhaps because of a nearly full moon shining through thin overcast. Temperature — 70° - 76°F

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STOP 281 - THAILAND: E. SLOPE, DOI SUTEP, 1100 - 1275 METERS, VII-15-62
800 specimens.

1100 meters elevation on this slope of Doi Sutep is the upper extremity of the middle zone, monsoon rain forest, and

STOP 280

resembles the forest. ~~[illegible]~~ ~~The transition zone [illegible] with [illegible]~~ The ~~[illegible]~~ forest here is more open, a bit shorter, and the understory less tangled, suggesting a transition into the upper vegetative zone. ~~[illegible]~~ Collecting ~~[illegible]~~ in the tall bushes and grass covering the slopes beneath the trees was productive, though the weather remained cloudy. Barking fallen trees and branches uncovered many beetles, Dermaptera, etc. Temp. - 75°F; periodic short showers.

~~At~~ 1275 meters one sees a good example of the high zone of Doi Sitep. ~~[illegible]~~ Some specimens were collected near the Thai palace ~~[illegible]~~ in an open wood of ~~[illegible]~~ well-spaced, broad-leaved oaks and many other large- and small-leaved trees 20-30 ft. tall, with more spreading canopies than trees in the middle zone. The forest structure in the upper zone, in fact, superficially resembles that of the lowest deciduous level, but much heavier rainfall is apparent near the top of the mountain. A distinct, rather lengthy dry season ~~[illegible]~~ effects the upper zone as well, and epiphytic growth is not extensive. Here grass 3 ft. deep, and small seedlings and shrubs up to 6 ft. tall cover the ground completely, though moving about is quite easy. Many fallen and cut trees & branches litter the ground, especially in the vicinity of the newly constructed road.

Below the palace a small dirt road winds around to the summit, in the vicinity of 4500 ft. elevation.

Fog, misty clouds covered this zone most of the time, and heavy rain fell occasionally. The vegetation was always wet.

No black light collecting.

STOP 282 - THAILAND:
13 MI. S.E. LEE, 600 M.,
VII-19-62
200 specimens.

(See also STOP 276)

Short stop in the major N-S range of hills dissected by the Chiang Mai - Lee road. Open, deciduous, broad-leaved woodland, a type of "monsoon forest" which covers large areas of N.W. Thailand. These specimens were collected on a rock-strewn ridge above the road. Bamboo, clumps of grass, and low shrubs and cycads are scattered among the small rocks. In general, the understory is scanty, though in full wet-season growth.

Partially cloudy midday, showers threatening one minute, sun shining briefly the next.

A special role in one large conserve an interesting relationship between a Trigona stingless bee and its Reduviid mimic; a good series of Reduviids were found on the resin tube entrance to the bee nest where they had lived generation after generation feeding on the bees themselves.

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STOP 283 - THAILAND:
10 MI. N. SARABURI, 100 METERS,
VII-21-62
2000 specimens.

These specimens were collected in the stop 273 habitat 10 days later. (See STOP 273 description). Very heavy rain had fallen over most of Central Thailand during this period; most of the Bangkok rice bowl was flooded. The streams and ponds in the Pukae Botanical Garden were swollen and more muddy, the ground was thoroughly saturated — in general, the whole area had a water-logged look. The weather during the afternoon and next morning was partially

cloudy, though full sunlight, ~~[illegible]~~ high humidity and 80°-85° temperature, broke through frequently.
The black light was located in the same place on top of a knoll near the forestry rest house.
Collecting was interrupted by a sudden downpour about 9 P.M, accompanied by a short-lived strong wind. Temperature — 73°F.

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3M. STOP 284 - THAILAND: BANGKOK, ~~sea level~~, VII-24-62
200 specimens.

These lowland specimens were collected along the full length of Sai Paidee Madi, between Sukhumvith Road and Klong Maha Nak.
The district is residential, the area near the Klong, or canal, is more open, with many marshy fields and some rice paddies. Sweeping the grass in small banana groves around village houses near the Klong was productive, and collecting in vacant lots, ~~along the road~~, among large milkweed and other bushes, was fair.
Weather — hot (90°F), humid, cloudy. No rain.

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STOP 285 - THAILAND!
N. GATE, KHAO-YAI NATIONAL PARK, 375 METERS, VII-25-62
300 specimens.

Khao-yai National park is located on a side road south several miles from the Friendship Highway to Korat. In this southwest corner of the Korat Plateau the escarpment is especially steep and high; from this scarp the plateau slopes gradually away to the east. The National park preserves an excellent sample of escarpment vegetation.
These specimens were collected within a mile radius of the park entrance. Roadside

rest areas were particularly good because flowers planted attracted many insects. A patch of tall, very distinct forest was sampled also, though insects were not plentiful there. The forest was quite dry, and the mixed deciduous and evergreen species of trees and shrubs indicated a rather dry monsoon climate. In more open areas grass clumps covered the ground, and large bamboo clumps were common in the area.

Weather partially cloudy, with light showers 78° F

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STOP 286 — THAILAND: KHAO-YAI NATIONAL PARK, 750 M.,
VII - 26 - 62
3000 specimens.

Tall rainforest in nearly original condition over a large area of rolling countryside on the edge of the Korat Plateau (see also STOP 285). Extensive patches of rainforest interspersed with large open grassland domes — a tall coarse grass, green at this season. Camp situated on a shelf which drops off into a rocky stream bed below, with a beautiful waterfall, surrounded by jungle. Many specimens were collected along this stream, in the sunny glades near the water, or in the deepshade of the forest where the ground is carpeted with low herbaceous plants, leaf mold, and rotting logs. The forest on the slopes is of a drier type, with more bamboo.

Glade light collecting — fair — 70°F evening. Weather — partially cloudy and windy at times.

Khao-yai Park is a very good place for biological work. One can either camp or stay in cottages which are under construction at this time. Good jungle is readily accessible, and the altitude is such that the climate is more pleasant than that of the rice bowl.

STOP 287 – THAILAND: 8 MI. S.E.
SARABURI, 100 M.,
VII-28-62
800 specimens.

Take the highway south from Saraburi toward Bangkok, turn off on a small road to the temple on the cliff at PHRA BUDDHA CHAI, and continue along this track to its end at a forestry nursery area in a small amphitheatre valley among low hills. Here there are two waterfalls, TONE RAK SAI and SAM LAN, each in its own little canyon. Much of the vegetation is secondary & disturbed, though some of the area looks pretty good. Much of the growth in the hills is very dense and tangled. Bamboo, tall grass, and thickhead are common. Some slopes have been cleared for banana plantations, etc. Area rather dry at this time of the year, though water still runs in the streams. Many good collecting trails traverse the hills and insect collecting is good. Weather hot and humid and still. Black light collecting in the little valley at the end of the road was fair; evening was clear and warm.

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STOP 288 – THAILAND: BANPE,
13 MI. E RAYONG 2M
VII-31-62
50 spec.

Camp in grassy dunes behind the beach in this pretty spot out on a point beyond the marine station and village. Pandanus, coconut palms, mangos, and bamboo-lantana scrub are the principle plants behind the beach at the foot of the hills. Better growth occurs on the hills but it is almost impenetrable. Weather cool and windy.

(Boaroys' place)

STOP 289 – THAILAND – 20 MI. S.E. CHANTABURI, 15 M., VIII-1-62

10 00 specimens.

Excellent camp off on a little dirt road, leading to a spectacular waterfall which issues right from the cliffs in a sheer canyon (not large but very impressive) with a beautiful pool below. Above the waterfall there is a large stream which must flow during heavy rains but which is normally dry since the water goes underground. Streambed filled with huge boulders. The area is very steep and hilly and is covered with excellent forest. Collecting is best along the edges or in places where the forest has been cut for rubber or banana plantations. (Rubber trees are planted extensively on the flatter ground at the base of the hills.) Weather – sunny part of the time, cloudy also. Moderate to cool, fairly still.

STOP 290 THAILAND: PRACHUAB, 2 M., VIII-6-62

100 specimens.

(See stop 272)

A one-night stop in this little seacoast town. Collecting was much worse than it was on July 6; strong winds were blowing, rain fell, and besides many of the good little spots along the edge of the hill had been cut over and cleared.

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STOP 291 – THAILAND: CHUMPHON 10 M., VIII-6-62

250 specimens

STOP 292 – THAILAND: KRACHONG FOREST, NR. TRANG 100 M.
VIII-8-62
200 specimens.

Stopped for a while in the same beautiful rain forest and waterfall area where we collected more thoroughly before (STOP 269) Collecting was about the same. The weather was warm and sunny for the most part.

MALAYA

STOP 293 – MALAYA: 3 MI. S.E. IPOH, 50 M., VIII-10-62
100 specimens.

We revisited this "punchbowl" mountain of limestone and collected again in the hidden valley inside its nearly vertical sides. (See stop 263). Collecting was not much changed; the area looked a little drier. Warm, sunny day.

STOP 294 – MALAYA: 16 MI. N.E. K. LUMPUR, 1000 ft., VIII-12-62
600 specimens.

(See STOP 254) Again we camped in our favorite forest area in the hills behind K. Lumpur, in the Gombock R. drainage. Collecting always seems to be good here. Again the male brookiana were abundant. Weather – the usual: sunny rain, cloudy then with showers. About the same all around as before.

STOP 295 - SINGAPORE:
BUKIT TIMAH, 100 ft.,
VIII-19-62
200 specimens.

(See STOP 251) Forest a bit drier than it was before. Collecting about the same.

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STOP 296 - SINGAPORE:
BOTANICAL GARDEN, 50 ft.,
VIII-20-62
100 specimens.

Some fair collecting can be had right in this park in the city itself. There are some large ponds bordered by a few good patches of forest very much like the original. Orchids visit the flowers in the gardens as well. Weather hot and humid. Rain recently.